OCTOBER 1965 35 CENTS

# Popular Science

Monthly

# HOW YOU'LL DRIVE 120 M.P.H. —LEGALLY!

## 1966 CARS: 28 Exciting Pages of Facts, Photos, and Expert Opinion

Our Anti-missile Missiles—Are They Ready?
Build Your Own Garden Mulcher
What Makes Stan Musial THE MAN?

- 7 Most-Needed Home Repairs
- What's Coming in '66 Outboards
- How to Wire Lighting Fixtures

# BETTER THAN EVER!

**Mail the Card Today for Your FREE Catalog**

**No Money Down • Easy Pay Terms**

**1966**
**CATALOG NO.**
**660**

*Live Better Electronically With*

# LAFAYETTE RADIO ELECTRONICS

## Over 500 Pages

# FREE!

- TV Tubes and Parts
- Electronic Parts
- Test Equipme
- Citizens Ba
- Tools
- Ham Gear
- Stereo Hi-Fi
- Tape Recorders
- Walkie-Talkies
- Auto Accessories

## *Featuring Everything in Electronics for*

## • HOME • INDUSTRY • LABORATORY

*from the*

## *"World's Hi-Fi & Electronics Center"*

**LAFAYETTE'S MAIL ORDER & LONG ISLAND SALES CENTER**

**LAFAYETTE Radio ELECTRONICS**
**Dept. KJ-3-5 , P.O. Box 10**
**Syosset, L.I., N.Y. 11791**

**Send FREE Lafayette Catalog**

Name _____

Address _____

City _____ State _____

Zip _____
(Please Give Your Zip Code No.)

**111 Jericho Turnpike**
**Syosset, Long Island, New York**

*OTHER LOCATIONS*

**NEW YORK—45th ST.**
71 West 45 St.
**BROOKLYN, NEW YORK**
2265 Bedford Avenue
**NEW YORK, NEW YORK**
17 Union Square W.
(cor. 15 St.)
**JAMAICA, NEW YORK**
165-08 Liberty Avenue
**SCARSDALE, NEW YORK**
691 Central Avenue
**BRONX, NEW YORK**
542 E. Fordham Road
**MT. RAINIER/ HYATTSVILLE, MD.**
3191 Queens Chapel Road
**NEWARK, NEW JERSEY**
24 Central Avenue
**PLAINFIELD, NEW JERSEY**
139 West 2 Street
**PARAMUS, NEW JERSEY**
182 Route 17
**BOSTON, MASS.**
584 Commonwealth Avenue
**NATICK, MASS.**
1400 Worcester Street

Urheberrechtlich geschütztes Material

# Where did the new Norelco Speedshaver ever get the idea that it could match shaves with a blade?

It's all in our head.

## (WHICH IS 18% THINNER THAN ANY OTHER ELECTRIC SHAVER HEAD FOR 18% CLOSER SHAVES)

The new Norelco Speedshaver® gives the *close* electric shave—so incredibly close that we dare to match shaves with a blade. And yet the Norelco shave is still the *comfort* shave. Because Norelco rotary blades gently stroke off whiskers. Never grab or pull. Never cut or nick. Norelco "Floating Heads" glide smoothly over every contour of your face. There's also a pop-up trimmer that makes neat work of sideburns. Easy "flip-open" cleaning. Voltage selector. On/off switch. And a coil cord. All in all, more shaving features than any other electric shaver. We'll match the shave you get with the new Norelco Speedshaver against any electric shaver and win by a head. And then it's *en garde*, blades!

**Great first shaver.**
The new Norelco 'Flip-Top' Speedshaver. Now in bright maroon.

**Perfect second shaver.**
Now at a new low price. The Norelco Cordless with drawstring pouch.

Norelco® The Close Electric Shave

©1965 North American Philips Company, Inc., 100 East 42nd Street, New York, New York 10017

**Other products:** Electric Housewares, Hearing Aids, Radios, Tape Recorders, Dictating Machines, Electronic Educational Kits. Medical X-ray Equipment, Electronic Tubes and Devices.



Urheberrechtlich geschütztes Mat

Founded in 1872
*Vol. 187 No. 4*

# Popular Science

*Mechanics and Handicraft ®*
*Popular Science ®*
**Monthly**

**Ernest V. Heyn**
**Associate Publisher and Editor-in-Chief**

HUBERT LUCKETT
**Executive Editor**

KENDALL W. GOODWYN
**Managing Editor**

HARRY SAMUELS
**Art Director**

ROBERT P. STEVENSON
**Editor, Home and Shop Group**

EVERETT H. ORTNER
**Copy Chief**

DEVON FRANCIS
**Special Assistant to the Editor**

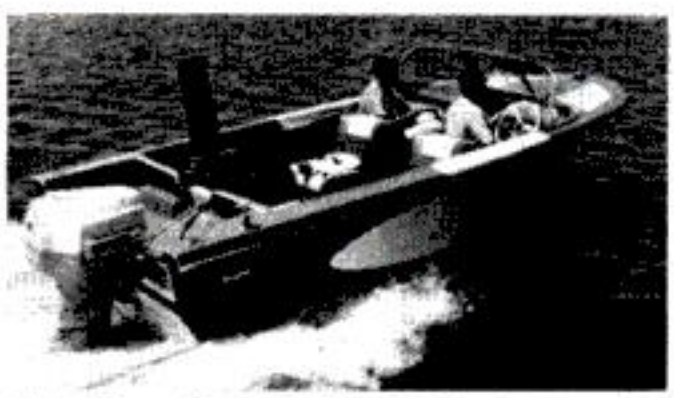
**Senior Editor**
Alden P. Armagnac
**Automotive Editor**
Jan P. Norbye
**Photography Editor**
Everett H. Ortner
**Science Editor**
Wallace Cloud
**Boating Editor**
Jim Roe
**Home Workshop Editor**
Charles E. Rhine

**Features Editor**
W. Stevenson Bacon
**Electronics Editor**
Ronald M. Benrey
**West Coast Editor**
Wesley S. Griswold
**European Editor**
David Scott
**Associate Editors**
Frank Dorr, Herbert O. Johansen
Herbert Shuldiner, Ruth Westphal

**Art Editors**
Herbert Anthony, Richard J. Meyer
**Art Associates**
Frank G. Bland, W. David Houser
**Art Production Manager**
Henry W. Kazmirowski
**Editorial Assistants**
Ruth Velazco (Chief)
Ann Dallas
Claire B. Kelly, Janine Molina
Mary Rose Schneider

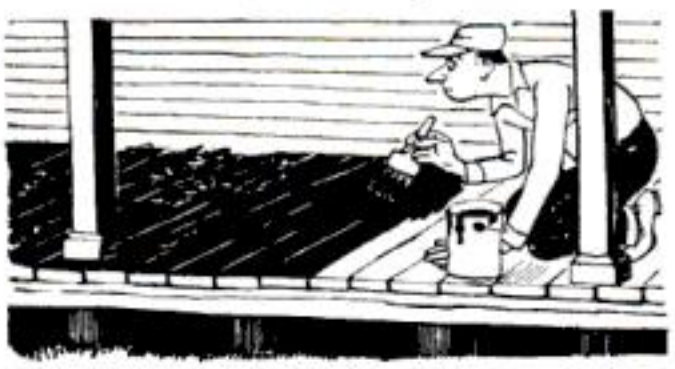
JOHN R. WHITING, **Executive Vice-President and Publisher**

*Cover painting by Pierre Mion*
**October 1965**



*"Hot" is the word for the '66 outboards, with four of over 100 hp. Full report. Page 112.*

*What's going on in basements all over the U.S.? Billiards! Here's your buyer's guide. Page 108.*



*Paint peeling? An expert tells you why—and advises on six other major house problems. Page 150.*

## 28 Pages of New-Car News

**Color Pictures of the 1966 Models**

The Sporty Ones . . . and the Luxuries · 58
The Standards · 60
The Intermediates · 62
The Compacts · 64

**CUSTOM-BUILD YOUR '66 CAR ON THE ORDER FORM**

The Line-Up: New Models vs. '65s · 65
At Ford Motor: Brakes and Power · 66
At Chrysler Corp.: Middle Cars · 71
At GM: More Variety · 75
At American Motors: More Luxury · 83

**PLUS** Detroit Report · 50

**CARS AND DRIVING**

"Say, Smokey—" · 14
Turbine Drives Chevy Truck · 88
How Fast Will We Drive? · 98

**SPECIAL REPORTS**

Rescued—200 Feet Underground · 89
Before You Buy a Billiard Table · 108
What Makes Stan Musial *The Man* · 126
Dream Cars Build Dream Careers · 170


Copyright © 1965 by Popular Science Publishing Co., Inc. All rights reserved.

**HOME AND SHOP**
Build a Gas-Powered Mulcher • 136
Shop Talk • 141
Three Woodworking Projects • 142
Saw Guide for Cutting Big Panels • 144
How to Make Glue Work Better • 146
Save Your Split Trees Now • 148
Roger Whitman on Home Repairs • 150
Wiring New Light Fixtures • 154
What's New in Tools • 161
2 Shop Tools with Low Price Tag • 162
Variable Speeds: Big Tool News • 164
New Way to Insulate a Basement • 168

**SPACE AND AVIATION**
Truth About Our Missile Defense • 84
von Braun: How We Steer Rockets • 94
Soft Landing on the Moon • 102

**SCIENCE AND INVENTION**
Science Newsfront • 23
Fiery Birth of a New Island • 92
Doughnut Decks Encircle Store • 125
New Ideas from the Inventors • 134
Now: A Bullet Without a Case • 173

**TV, RADIO, AND ELECTRONICS**
What's New in Electronics • 129
Installing Your Own Car Radio • 130
TV Camera You Build from a Kit • 132

**BOATS AND BOATING**
Hotter, Handier, Quieter Motors • 112
What's New in Boating • 118

**PHOTOGRAPHY**
What's New in Photography • 119
A's to Q's About Camera Lenses • 120

**AUTO REPAIR**
Gus Runs Into an Odd Customer • 174
Hints from the Model Garage • 182

**PICTURE NEWS**
Plastic Igloo Shelters Campers • 106
Giant Statue Carved from Foam • 124

**EVERY MONTH**
PS Readers Talk Back • 6
I'd Like to See Them Make • 96
Wordless Workshop • 188




# Now Elmer's helps you fill, caulk, seal, patch

SEALS AROUND TUBS, SHOWERS, SINKS

**Elmer's Instant Spackling Paste** is a ready-to-use compound that puts an end to wasteful and messy mixing. Just press the stem of the aerosol container for the right amount to fill holes, cracks and low spots in plaster, wood or composition walls before painting. Dries in minutes and sands to a feather edge.

**Elmer's Tub Caulk** is an elastic sealer, ideal for waterproofing jobs in kitchen, laundry and bath. The handy squeeze tube delivers a satin-white bead that won't discolor or crumble. Simply remove excess with water, no solvents needed. Safe for any surface, nontoxic and odorless. The Borden Chemical Company, 350 Madison Ave., N.Y., N.Y. 10017 (Available in Canada.)

BORDEN CHEMICAL

© TBC




Urheberrechtlich geschütztes Material

# NEXT MONTH IN POPULAR SCIENCE

- **NEWS REPORT from the driver's seat.** Climb aboard with Jan Norbye, PS Automotive Editor, as he puts seven spanking-new '66 cars through their paces, tells you what he likes—and doesn't like—about their engineering, performance, braking, cornering, comfort, gadgetry. The cars: Ford, Chevy, Plymouth, Falcon, Chevy II, Valiant, American.

- **In the same issue, don't miss:** Pros and Cons of Jet Boats, 10 Ways to Improve Your TV Picture, How to Wire a Home Workshop, Building a Kid-Proof Workbench, and Erle Stanley Gardner's "My Love Affair with Sand and Wheels." November POPULAR SCIENCE—on sale October 28.

**EXTRA! Why Can't We Make Safer Cars? by Sen. Robert F. Kennedy**

---

*Return postage must accompany all manuscripts submitted. We cannot be responsible for the loss of manuscripts or photos.*

---


E. S. DUFFIELD, President

JOHN R. WHITING
Executive Vice-President and Publisher

ERNEST V. HEYN
Associate Publisher and Editor-in-Chief

EUGENE WATSON, Vice-President, Circulation

CHARLES S. THORN, Vice-President, Advertising

EDITORIAL OFFICES: 355 Lexington Ave., New York, N. Y. 10017

PUBLISHED MONTHLY by Popular Science Publishing Co., Inc., 355 Lexington Ave., New York, N. Y. 10017

SUBSCRIPTION SERVICE. ***New or renewal orders:*** Send to Popular Science Subscription Department, Boulder, Colo. 80313. One year $4, 2 years $7, 3 years $9 in U.S., its possessions, and Canada. Elsewhere, 1 year $6.50, 2 years $12, 3 years $17. Single copy 35¢. *Subscription orders processed electronically* ● ***All subscription adjustments:*** Write to Robert Harlan, Popular Science, P.O. Box 1083, Boulder, Colo. 80313. For change of address allow six weeks; please give both old and new addresses. Notices of undelivered copies (Form 3579) to Mr. Harlan ● Second class postage paid at New York, N.Y., and at additional mailing offices. Entered as second class matter at the Post Office Department, Canada. Printed in U.S.A. ● ADVERTISING OFFICES, NEW YORK: 355 Lexington Ave., CHICAGO: 401 N. Michigan Ave.; DETROIT: 2907-8 Book Bldg.; LOS ANGELES: 8721 Beverly Blvd.; SAN FRANCISCO: 110 Sutter St.; DENVER: 333 W. Colfax Ave.


---


*NEW FROM HONDA—*

# THE HONDA E-40 PORTABLE GENERATOR

New from the world's leader in motorcycle and engine design, the first truly compact and versatile answer to every outdoorsman's power needs. Lightweight, quiet and unerringly dependable, the Honda E-40 can supply light at campsites, provide emergency power for a wide variety of uses, even operate transistorized television sets, absorption-type refrigerators (up to 50 watts). And at a reasonable price. Best of all — it's from HONDA.

*The Honda E-40 is rated @ 40 watts, 117 volts AC. Four-stroke engine. Weight: 16 lbs.*

# HONDA

You're Always Ahead With Honda — Products of Creative Research

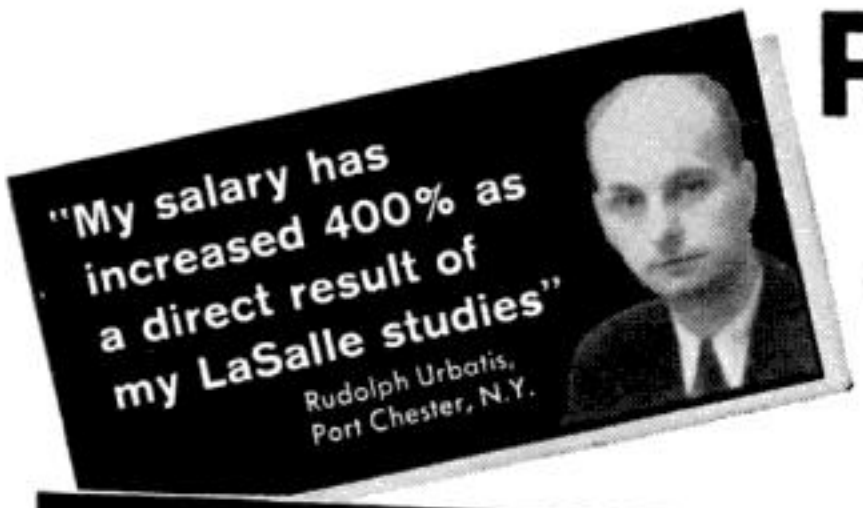
**For further information, write: American Honda Motor Co., Inc., Department A, 100 West Alondra Boulevard, Gardena, California. Dealer inquiries invited!**

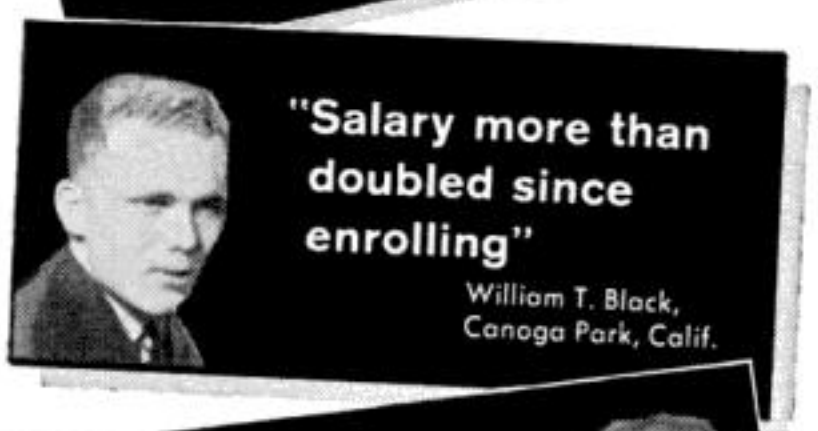


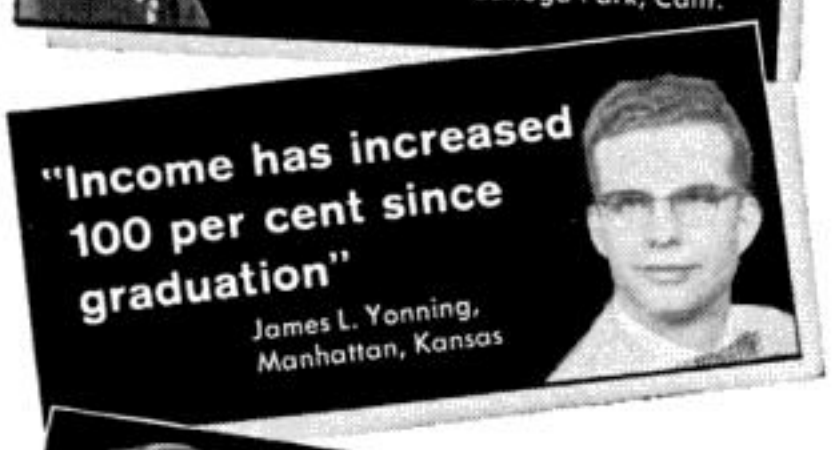


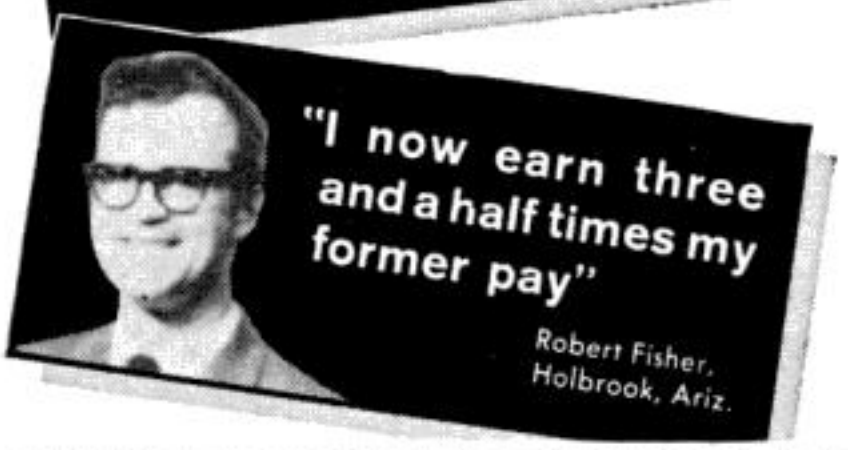
Urheberrechtlich geschütztes Material

# WHO ELSE WANTS A BIG RAISE IN PAY?




## Stuck in a rut? Tired of your dead-end job? Here's proof you can step up to a high-salary position with prestige and security through LaSalle spare-time training.

JUST LOOK at these enthusiastic letters. Have you ever seen anything like them? They are just a few of many hundreds of similar statements in letters that come from LaSalle students week after week, month after month, year after year.

LaSalle students have one ambition in common — to get out of the ranks of the untrained and earn big money, prestige and security in a key job. Isn't that your goal too?

Without interfering with your present work — and by devoting only a little of your spare time — you too can prepare rapidly for advancement in the field of your choice through LaSalle home study. The cost is surprisingly low.

LaSalle has been an acknowledged leader in home education for more than half a century. It has provided training in business, high school and technical subjects to more than 1,000,000 ambitious men and women. Its distinguished faculty includes some of the country's most outstanding authorities. That is why your LaSalle diploma is a credential recognized and respected by employers.

Check the subject you are interested in — then send the coupon below for FREE booklet. No obligation. Mail to LaSalle, 417 South Dearborn, Chicago, Illinois 60605.

## LA SALLE EXTENSION UNIVERSITY

*A Correspondence Institution* • **417 South Dearborn, Dept. 46-066, Chicago, Illinois 60605**

Please send me, without cost or obligation, FREE booklet and full information on the field I have checked below:

**ACCOUNTING**
- ☐ Complete Accounting with CPA Training
- ☐ General Accounting
- ☐ Income Tax
- ☐ Accounting Fundamentals
- ☐ Auditing
- ☐ Controllership
- ☐ CPA Training
- ☐ Modern Bookkeeping

**BUSINESS MANAGEMENT**
- ☐ Complete Business Management
- ☐ Credit and Collections
- ☐ Office Management
- ☐ Personnel Management
- ☐ Business Correspondence

**LAW COURSES**
- ☐ Bachelor of Laws Degree
- ☐ Business Law
- ☐ Insurance Law
- ☐ Claim Adjusting Law
- ☐ Law for Police Officers
- ☐ Law for Trust Officers

**SALESMANSHIP**
- ☐ Sales Management
- ☐ Complete Sales Training

**DRAFTING**
- ☐ Basic Drafting
- ☐ Aeronautical Drafting
- ☐ Architectural Drafting
- ☐ Electrical Drafting
- ☐ Mechanical Drafting
- ☐ Structural Drafting

**REAL ESTATE**
- ☐ Complete Real Estate
- ☐ Real Estate Brokerage
- ☐ Real Estate Management
- ☐ Real Estate Sales

**TRAFFIC AND TRANSPORTATION**
- ☐ Complete Traffic Mgt.
- ☐ Transportation Law
- ☐ Rates and Tariffs
- ☐ Agency and Services
- ☐ Motor Truck Traffic

**STENOTYPE**
- ☐ Machine Shorthand

**TECHNICAL COURSES**
- ☐ Mechanical Refrigeration
- ☐ Air Conditioning, Refrigeration and Heating
- ☐ Diesel

**HIGH SCHOOL**
- ☐ High School Diploma

**CAREERS FOR WOMEN**
- ☐ Interior Decorator
- ☐ Dental Assistant
- ☐ Secretarial
- ☐ Accounting
- ☐ Bookkeeping
- ☐ Real Estate

Name.....Age.....

Address.....County.....

City & State.....Zip No.....

Occupation..... Working Hours....A.M.....P.M.

321



Urheberrechtlich geschütztes Material

# PS readers talk back

***Want to get something off your chest? Write "Readers Talk Back," Popular Science, 355 Lexington Ave., New York, N.Y. 10017.***

### The Other Man's Opinion

Glenn Merrill, who claims that in PS "science seems just a sideline" ["PS Readers Talk Back," Aug.], should dip into the dictionary. According to Webster's, science is "knowledge attained through study and practice." PS is exactly that: a magazine jam-packed with knowledge.

KEVIN HANSON, Austin, Minn.

### The Flying Game—80 Hours Plus

In "How to Become an Airline Pilot" [Aug.], you speak of piloting as a part-time job. In 16 years as a pilot, I have never succeeded in working as little as 80 hours a month. Under the best of circumstances, one can get an hour's flying time in two hours "on duty." This adds up to 160 hours a month, or 40 a week. Most runs are not that good, and the ratio usually runs 2½ to three hours on duty for each hour of flying time.

By "on duty" I mean also the before-flight preparation (a minimum of an hour), all the ground time at each stop, plus the de-briefing at the terminating station. The on-duty time

does not include all the hours of study, training, tests, reports, etc., that are part of the game.

LYLE H. GILDERMASTER
Delta Airlines, New Orleans.

### Clean Shops Sprouting Up All Over

I built your "Shop Vacuum for Less Than $10" [Jan.] and made a few changes that might be of interest to others about to build one:

In place of the tin-can sleeve, use the attachment-hose adapter plate from the old vacuum cleaner. This permits use of the hose and its attachments in place of the defroster hose specified, and permits easy removal of the hose.

Instead of a plain hole for the exhaust port, use a second attachment-hose adapter plate. Then the hose can be connected to the exhaust and the vacuum becomes a blower.

Bolt a handle—taken from the old vacuum cleaner—to the drum directly above the wheels so that it protrudes about six inches above the top of the drum, and you can move the cleaner about with ease.

D. C. HESTERMAN, Wisconsin Rapids, Wis.

. . . When I built your shop vacuum, I riveted the female portion of the hose's compression fitting to the lid [photo]. I now have an easily detachable hose for general cleaning around the shop. I also provided the two-inch fitting for the power-saw attachment. To close the hole that is not in use, I lay a plastic disk over it and the suction of the vac seals it tightly.

R. M. LEFEVER, York, Pa.

### The Mailman Cometh

If Mr. Miller ["I'd Like to See Them Make," Aug.] will settle for less than a light-up signal of mail delivery, he can rig up his rural mailbox like this:

Fasten a chain on the underside of the board on which the box rests. From the chain, hang an easily seen, flat metal disk and a small wooden wedge. Put the wedge in the door of the box. When the mailman opens the box, the wedge falls out and you can see the dangling disk.

LEROY W. MILLER, Rome, N.Y.

. . . While our Step-Saver signal for mailboxes doesn't light up, when the mailman puts mail in the box, the signal arm automatically lifts. It's large enough to see at a distance, and requires no batteries.

MERCHANTS ENTERPRISES
523 S. 11 Ave. W., Newton, Iowa.

### Adding a New Twist

In "Hints from the Model Garage" [Aug.], you suggest keeping a couple of rubber bands around a flashlight so it can be snapped to your arm for use. I've discovered that if you twist bulky rubber bands around the flashlight just ahead of the switch, the flashlight can't be accidentally turned on (and run down) while stored in the car's glove compartment.

H. J. ANDREWS, Ames, Iowa.

### Four to the Cycle

I enjoy your magazine and think it is the best, but you could do a little better on engine



CONTINUED

Urheberrechtlich geschütztes Material

# If you must use a circular saw—

## FOR SAFETY'S SAKE—
## Use the BEST!

A bargain saw may not be a safe buy!

New Wen Stallions were created with superior safety factors as a primary objective. Stability, necessarily a part of safety, results partly from front end adjustments that permit the saw to be tilted toward the rear. Your hand is always behind the blade for better cutting control. Heavy cast aluminum depth quadrants plus extra rigid steel angle quadrants assure stability at any depth or angle of cut.

Perfect balance means safety, too. With it you're never "fighting" the saw—no matter what the depth or angle of cut. And the Stallions' low profile indicates its low center of gravity. This, plus the full contour, one-piece handle, keeps the proper down/forward ratio of cutting force behind the blade shaft at all times. This special design aid contributes greatly to precision cutting and safety.

Precision engineering inside and out—heavy duty bearings, high efficiency motors, rigidly braced shoe plates, ZERO depth and angle adjustments, blades of higher quality than are normally found—all these make major contributions to operator safety.

Other built-in safety features are anti-kickback clutch, sawdust ejector, powerful blower clears line of cut, and a heavy-duty cord that stays clear of the saw blade and work.

Your choice of a 12 amp—2½ H.P. motor; or a 10 amp 1¾ H.P. motor. All Wen tools are U.L. and C.S.A. listed.

Ask your dealer about the price — you'll be pleasantly surprised.

**WEN MIGHTY STALLION**

*7¼" CIRCULAR SAW*

**WEN**

**100% AMERICAN MADE**

**PRODUCTS, INC.**

**5810 Northwest Highway • Chicago, Illinois 60631**

Urheberrechtlich geschütztes Material

# DANA ANDREWS, Star of Stage, Screen and TV. . . Reports on AMERICA'S MOST REMARKABLE BUY IN PROFESSIONAL QUALITY POWER TOOLS...

**DANA ANDREWS . . . Star of "CRACK IN THE WORLD" in Technicolor—a Paramount Release—writes** . . . "Like most people, I guess, I sure had my doubts about how anyone could sell machines that are supposed to do so much . . . for so very little. I was never more pleasantly surprised! Every claim for them—and more—is true. Putting them through the most rugged workouts, has convinced me that the AMCO people know something no other manufacturer in America has been able to find out. These machines are, without question, a most remarkable buy in professional quality power tools."

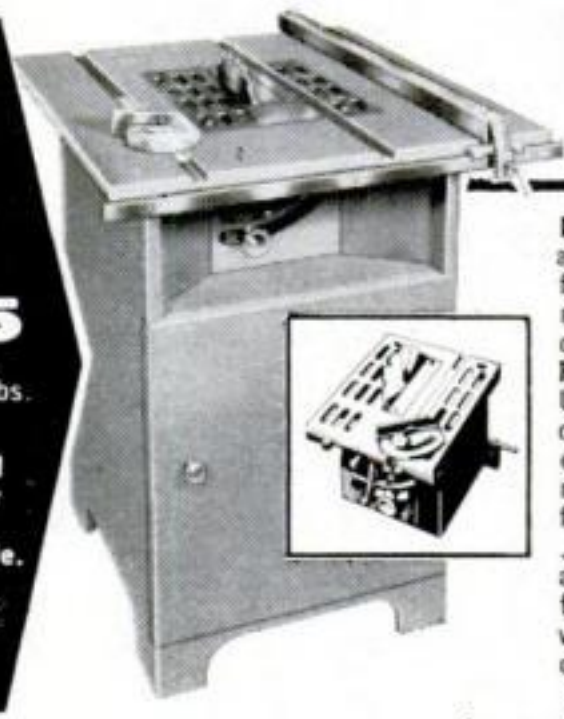
## BUY DIRECT FROM OUR FACTORY Amco POWER TOOLS SAVE AS MUCH AS 80%

### 8" TILT ARBOR POWER SAW

**$14.95**

f.o.b. factory. Wt. 25 lbs.

**Includes completely assembled cast iron and steel 8" tilt arbor power saw with ground cast iron table . . . less blade. If desired, RIP FENCE for easier work alignment, $3.50 additional**



**REVOLUTIONARY PATENTS DECREASE COSTS, INCREASE EFFICIENCY**
Full scale power tools of heavy duty 100% cast iron and steel. Streamlined design reduces weight, cuts material and production costs. Special patents provide added efficiency, accuracy, savings. Parts made, assembled, tested and packed right in our own factories, shipped direct . . . save store profits.

**DOES WORK OF $75 BENCH SAW** as is. Converts easily to equal any $300 floor model cabinet units! Crosscuts, rips, mitres, cuts compound angles, dadoes, makes coves and mouldings.

**FREE CABINET BASE PLANS**
Use as portable bench saw as received (inset photo) . . . or transform easily and inexpensively into floor model (as shown) guar. to do work of floor models costing $300. FREE plans . . . sheet of ¾" plywood and 3-4 hours are all you'll need. Use your AMCO saw for cutting. Plans provide 27" x 24" work surface, 33" height, pullout sawdust bin, tool storage compartment.

**10-YEAR FULL SERVICE GUARANTEE ***

**BLADE TILTS . . . TABLE STAYS LEVEL**
• Locks securely at any angle to 50°, raises, lowers 0"-2¼" • Patented tilt mechanism, accurate etched scale • Patented motor mount takes std. ¼ h.p. or larger motor, keeps belt tight, assures perfect alignment at any angle, transmits full power • Takes std. blade, saw insert removes to take dadoe heads, cutters, etc. (not incl.) • Accurate mitre gauge assembly • Ground spindle • Enclosed steel base • "Compo" bearings • Accessories available at factory prices • RIP FENCE, if desired for easier work alignment: Std. size (for bench saw) $3.50; larger fence (for cabinet base, as ill'd.) $4.50.

### 6" SWING 3-FT. LATHE

**$9.85**

f.o.b. factory

**Optional Faceplate for turning bowls, trays, lamp bases, rosettes, etc. $2.50**

Complete as shown

**DOES THE WORK OF $40 UNITS—** Sturdy all cast iron power tool turns wood or plastics with the precision and speed of machines selling for 4 times as much. Tubular steel bed, ball thrust cup center, spur center, T-Rest assembly, lever action tail stock. 2 speed pulley. Fits any motor.

**10-YEAR FULL SERVICE GUARANTEE ***

### FULL 22" LONG, 4⅛" JOINTER-PLANER

**$19.95**

F.O.B. Factory Complete as shown

100% precision ground cast iron and steel.

**DOES WORK OF $60 UNITS**
Now, at little more than a hand tool price, a guaranteed professional quality precision machine which does same work as skilled hand planing . . . much faster, more accurately. Make accurate glue joints; rabetting cuts for doors, window frames, table drawers; square taper cuts for chair legs; accurate beveling.

**• Precision ground cast iron tables, adjustable for depth of cut • Rigid cast iron base • New patent-pending design holds clearance between knives and tables at any depth • Rabett depth ⅜" • Hardened, ground high speed steel knives • Patent-pending fence adjustable to any position, any angle 0°-50° • Patent pending lift-off guard (nothing to loosen!) • Balanced steel cutter head.**

**10-YEAR FULL SERVICE GUARANTEE ***

**UNCONDITIONAL 10-DAY MONEY BACK GUARANTEE**
You must be fully satisfied. If not, return in 10 days, freight collect. Money refunded in full, no questions asked.

### OR 1/2 HP ELECTRIC MOTOR

**SPECIAL AMCO PRICE (when purchased with any unit in this ad)**

**$12.95**

f.o.b. factory

**If purchased separately, $18.95**

**SPECIAL LIMITED TIME ONLY**
Brand new factory-fresh motors for use with any of the units on this page. Limited quantity purchase . . . first come, first served. Wt.: 17 lbs.

**FULL SERVICE 1-YEAR WARRANTY ***
Otherwise, as described below

### PRECISION 4"x36" BELT SANDER

**$14.95**

**f.o.b. factory Wt. 15 lbs.**

**Optional Disc Sander incl. disc, bracket, ground cast table (tilts 0-45°): $7.95 add'l. Mitre gauge: $1.95 add'l.**

**DOES WORK OF $50 SANDERS**

After 23 mos. of design and testing, AMCO offers the world's most talented belt sander at a fraction of the usual cost.

**Heavy cast sander incl. 4" x 36" sanding belt, V-pulley drive, multi-purpose drive spindle for ¼" shank acc'ssy tools. Changes from horizontal to vertical sanding in secs. Uses 1/3 hp or larger motor.**

**10-YEAR FULL SERVICE GUARANTEE ***

## MAIL COUPON TODAY!

**AMERICAN MACHINE & TOOL CO., Dept. PS105, Royersford, Pa.**

Please send me the units checked. Payment in full enclosed $..... or $3 deposit each item enclosed, balance C.O.D.

☐ I MUST BE FULLY SATISFIED OR WILL RETURN UNIT WITHIN 10 DAYS FOR FULL REFUND. No questions asked.

☐ 8" Power Saw at $14.95 ☐ Jointer-Planer at $19.95
☐ Long Rip Fence ⌯354C at $4.50 ☐ Lathe at $9.85 with
☐ Standard Rip Fence ⌯354 at $3.50 faceplate $12.35 ☐
½ hp Motor: ☐ $18.95 ☐ $12.95 (purchased with other item)
☐ Belt Sander at $14.95 ☐ Disc Sander at $7.95
☐ Mitre gauge at $1.95

NAME .....
ADDRESS .....
CITY .....ZONE/ZIP .....STATE .....

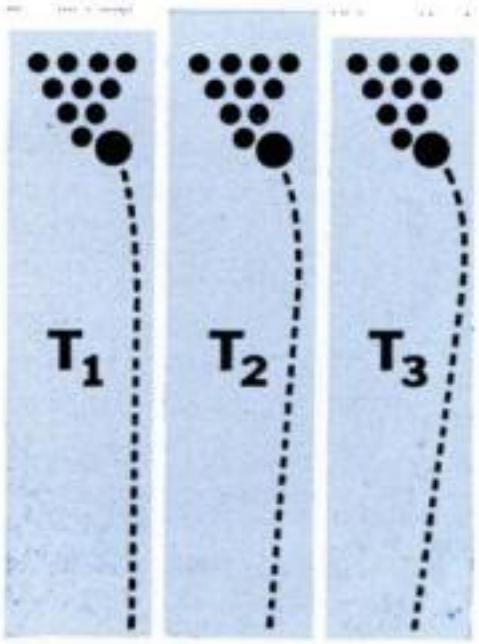
***10-YEAR FULL SERVICE GUARANTEE** Any part or parts of any AMCO power tool which may become inoperative for any reason within **ten years** after the purchase date will be repaired or replaced by the factory without cost to the purchaser. Your only cost: for postage.



Urheberrechtlich geschütztes Material

# Trac-master hooked thousands of bowlers last season

Trac-Master is the distinctive, new gun-metal blue ball with selective and corrective hooking potential. Lets you choose the hook you want without changing your style.
Trac-Master is a Brunswick exclusive. And it is sold only by Brunswick Pro Dealers. Trac-Master offers a choice of 3 hooking potentials: T-1 to minimize your present hook; T-2 for a standard hook; T-3 for maximum hook. Meets all A. B. C. specifications.




No matter what ball you now own, you'll want a Trac-Master. It's the hottest selling new bowling ball in Brunswick history. (And Brunswick has sold more bowling balls than all other manufacturers combined.) Better bowlers everywhere are discovering how much this unusual new ball does to improve their game. Price, only $29.95.

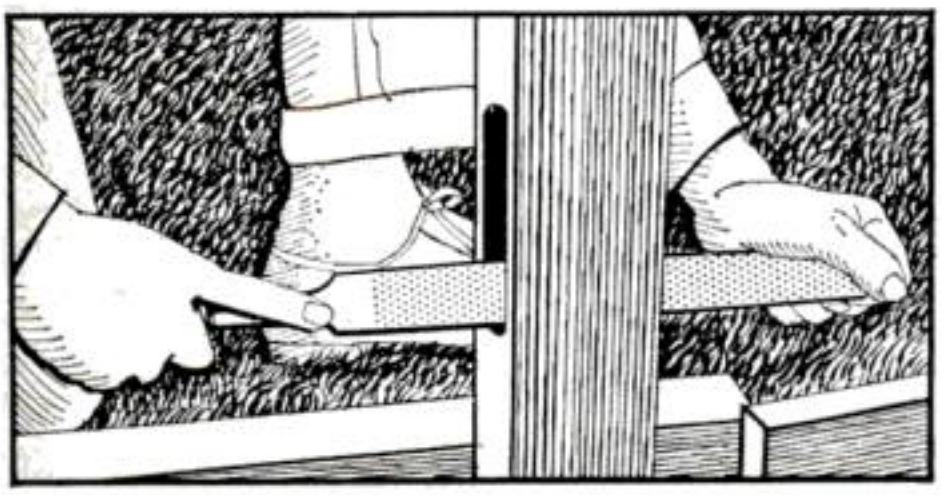
**Brunswick**
*THE NO. 1 NAME IN BOWLING*

SEE YOUR PRO DEALER



Urheberrechtlich geschütztes Material

# CALLING ALL FILERS AND RASPERS



From fitting a fence to filing a fish lure—there's a quality Nicholson or Black Diamond file or rasp that's right for the job. In fact, we make a file or rasp for every purpose. They're all built with the same high Nicholson standards.

That means you get maximum performance at a cost that's economical. And best of all, they're available at your local hardware dealer. See them soon.

If you are interested in the selection, care and use of files and rasps, you would probably enjoy our booklet, "File Filosophy." Time spent reading it is well worth while. Sent at no cost to you.

**NICHOLSON**

Nicholson File Company, Providence, Rhode Island
Files • Rotary Burs • Hacksaw and Band Saw Blades
Hole Saws • Ground Flat Stock • Industrial Hammers

NICHOLSON® U.S.A. BLACK DIAMOND® U.S.A.


## PS readers talk back continued

terminology. In "Civilized Cycles" [July], you correctly use the term "two-stroke-four stroke," then in the same article refer to two cycle vs. four cycle.

A cycle is a series of events occurring in sequence. The cycle ends when it starts to repeat. Intake, compression, ignition (power), and exhaust make one cycle with two or four strokes, depending on design.

R. G. Cole, Greenwood, Nova Scotia.

*Actually, "four cycle" is a telescoped form of "four-stroke cycle." Webster's (Unabridged) defines four cycle as "having a four-stroke cycle." Chamber's Technical Dictionary defines four-stroke cycle as "an engine cycle completed in four piston strokes (i.e. in two crankshaft revolutions), consisting of suction or induction, compression, expansion or power stroke, and exhaust."*

### The Driver's License Problem

May I comment on the red tape and delay of constant—and surely unnecessary—replacement of a driver's license?

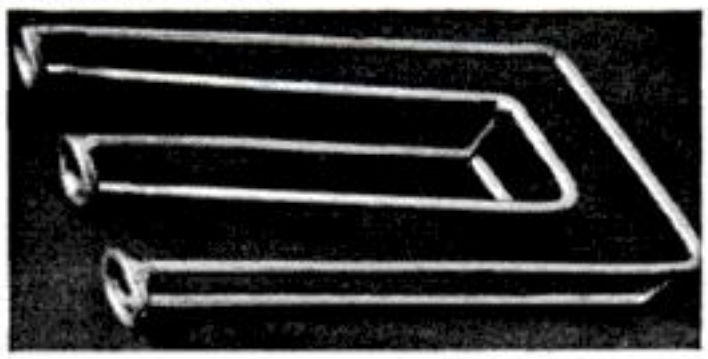
A license is usually good for two or three years, but we've lived in three states in a two-year period. This means three tests and three license fees. Sometimes you have to wait 30 days before applying—just when you need a car to find a place to live and get settled in. All this makes me favor a national driver's license, with good driving tests and physical examination, repeated at sensible intervals.

I've had four tests in nine years, yet I know people who never had to take a test.

[Mrs.] Betty Henderson, Pittsburgh, Pa.

*Why not standard tests in all states and reciprocity for still-in-force licenses?*

### The Undying Blivet



One of your (unintentional) projects provided a good deal of fun downunder. As a joke, we wrote one of our retired engineers, enclosing specs for the amazing "blivet," the optical illusion you ran a year ago ["PS Readers Talk Back," July, 1964]. Asked to machine a prototype positioning jig for the fingers of a crossbar code selector-register (blivet), he came up in about three weeks with this model.

E. A. Welsh, Victoria, Australia.

. . . Readers interested in optical illusions

CONTINUED



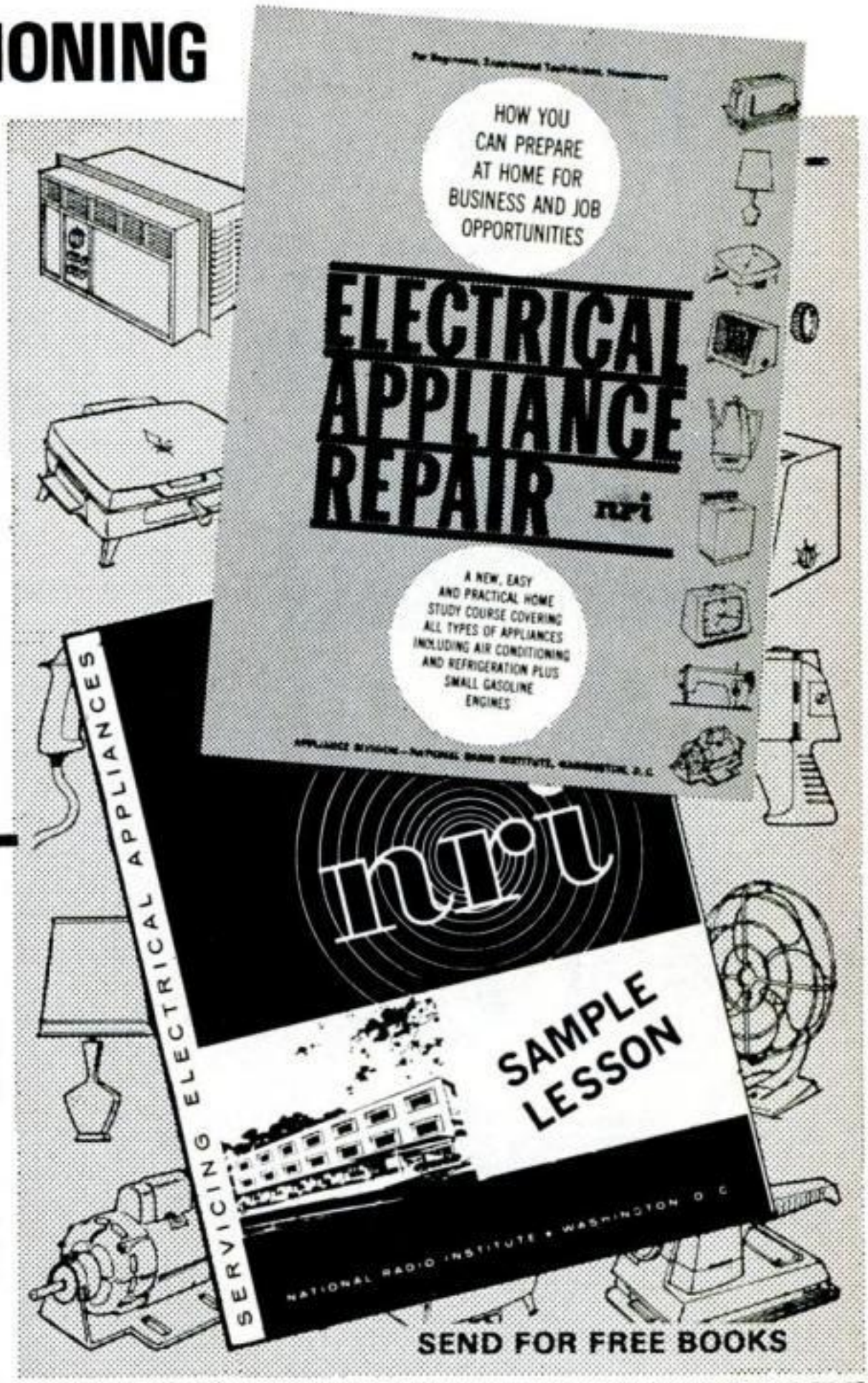
Urheberrechtlich geschütztes Material

# EARN-WHILE-YOU-LEARN APPLIANCE REPAIR AND AIR CONDITIONING

## THESE TWO
# FREE BOOKS

## CAN START YOU ON YOUR WAY TO:

- new high-pay skill
- business of your own
- spare time income
- savings on appliance repairs


HOW YOU CAN PREPARE AT HOME FOR BUSINESS AND JOB OPPORTUNITIES
ELECTRICAL APPLIANCE REPAIR
nri
A NEW, EASY AND PRACTICAL HOME STUDY COURSE COVERING ALL TYPES OF APPLIANCES INCLUDING AIR CONDITIONING AND REFRIGERATION PLUS SMALL GASOLINE ENGINES
SERVICING ELECTRICAL APPLIANCES
nri
SAMPLE LESSON
NATIONAL RADIO INSTITUTE • WASHINGTON D C
SEND FOR FREE BOOKS

## *THIS NEW, SHORT EASY COURSE TRAINS YOU AT HOME*

**THE BEST WAY TO GET AHEAD**
is to make yourself better qualified than the next man. You can prepare quickly to do *professional* appliance servicing at home in your spare time.

**NEW EASY COURSE**
shows you step-by-step professional methods for repair of all types of appliances...including air conditioning, even small gasoline engines, farm and commercial equipment.

**AMAZING PROFITS**
in your spare time...in improved job opportunities...in a business of your own. You earn-as-you-learn *professional* methods of appliance repairs...are ready to start servicing appliances after only a few lessons.

**LOW COST TRAINING COVERS**
everything...special equipment is included in your course at no extra cost.

APPLIANCE DIVISION, NATIONAL RADIO INSTITUTE
3939 Wisconsin Ave., Washington, D.C. 20016

**MAIL THIS COUPON TODAY!**

**Appliance Division, Department 601-105**
**National Radio Institute**
**3939 Wisconsin Avenue , Wash.,D.C. 20016**

Send me the illustrated free book that tells about opportunities in Electrical Appliance Repair and details of NRI's new course—plus a sample lesson. I understand there is no obligation and no salesman will call.

Name ..... Age .....

Address.....

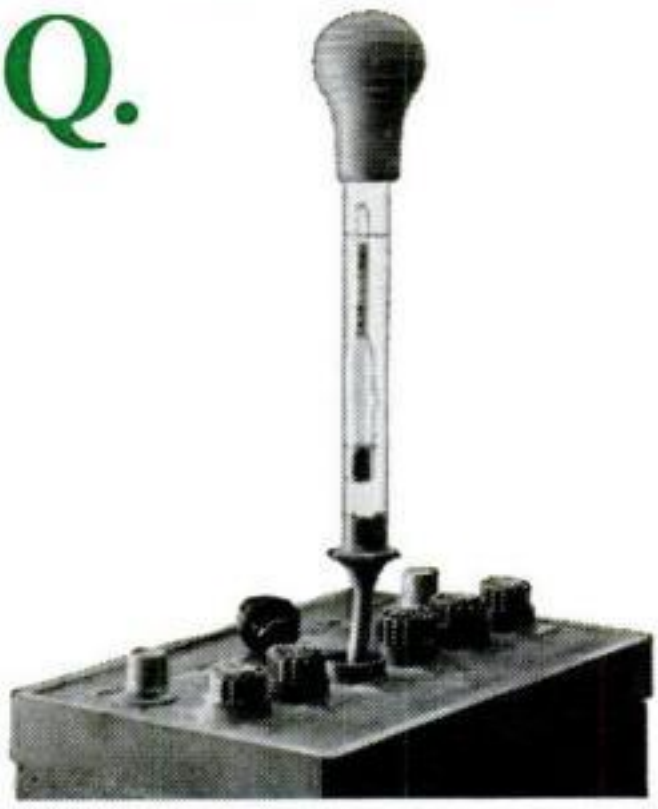
City ..... State ..... Zip Code .....

Accredited Member National Home Study Council

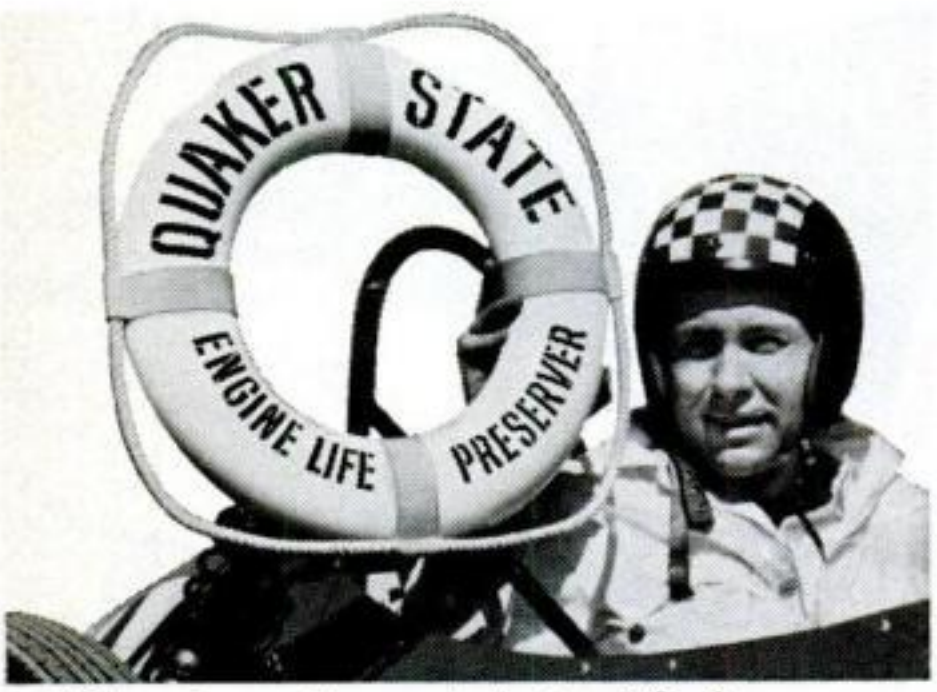


Urheberrechtlich geschütztes Material

# Test your automotive I.Q.



*When this instrument reads 1260, what does it tell you?*




*What does this symbol stand for?*

The battery hydrometer reports the state of your car battery's charge. 1260 means it's fully charged. The life preserver stands for Quaker State Motor Oil—the best engine life preserver for your car. It's refined only from 100% Pure Pennsylvania Grade Crude Oil. Quaker State keeps your car on the road, out of the repair shop. So keep your car running young. Always ask for Quaker State Motor Oil by name.

QUAKER STATE OIL REFINING CORPORATION
OIL CITY, PENNSYLVANIA


# PS readers talk back continued

might like to see my Whatzamakookie Arch. I hope they find it confusing!

BILL POPE, Pittsburgh.

### A *Real* Problem

Every now and then someone comes up with a suggestion on what you can do if a car headlight burns out—to let the other driver know that your car is not a motorcycle.

Can anyone come up with a suggestion on how you can let the other driver know that you *don't* have a burned-out lamp—you're driving a motorcycle?

PETER HARAGUCHI, Hilo, Hawaii.

*Wear a fiery-red reflector on your forehead. And pass the word around.*

### Real Cool Answer Wanted

In developing dental X-ray films, the temperatures of the developing and fixing solutions are important for clear images. Hence most of us use a thermometer and hot and cold tap water to arrive at the ideal processing range (60 to 70 degrees F.) for solutions.

This summer, our tap water never seems to go below 72-74, no matter how long it runs. Can anybody suggest a method of cooling the water coming in to the processing tank—a condensing-coil-type apparatus, or something like that?

FRED N. SAGER, DDS, Danville, Va.

### Personal-Use Report

You've had a lot on record players, but have never answered my question: What is the best stylus size for playing standard 45s?

CRAIG BRADLEY, Birmingham.

*With most ordinary mono record players, the best stylus size is the standard one mil. The 0.7- and 0.5-mil styluses have some advantages but must be used in tone arms that will track properly at a stylus force of under two grams to avoid excessive groove wear.*

### Tip for Wheel Balancers

Any readers about to balance their car wheels might like to know about a simple trick of mine that will increase balancing accuracy: Since wheel-bearing grease is quite stiff, I drive my car a few miles to heat the hub. This thins out the grease, greatly reduces bearing friction, and helps a lot in determining the light point on the wheel. Otherwise, I follow directions given in PS last December.

VERNON MAGILL, Oklahoma City.



Urheberrechtlich geschütztes Material

Controlling a Lotus-Ford thru a fast bend at 145 MPH is nothing new to A. J. But controlling the speed of a drill by squeezing the trigger! That's something else.

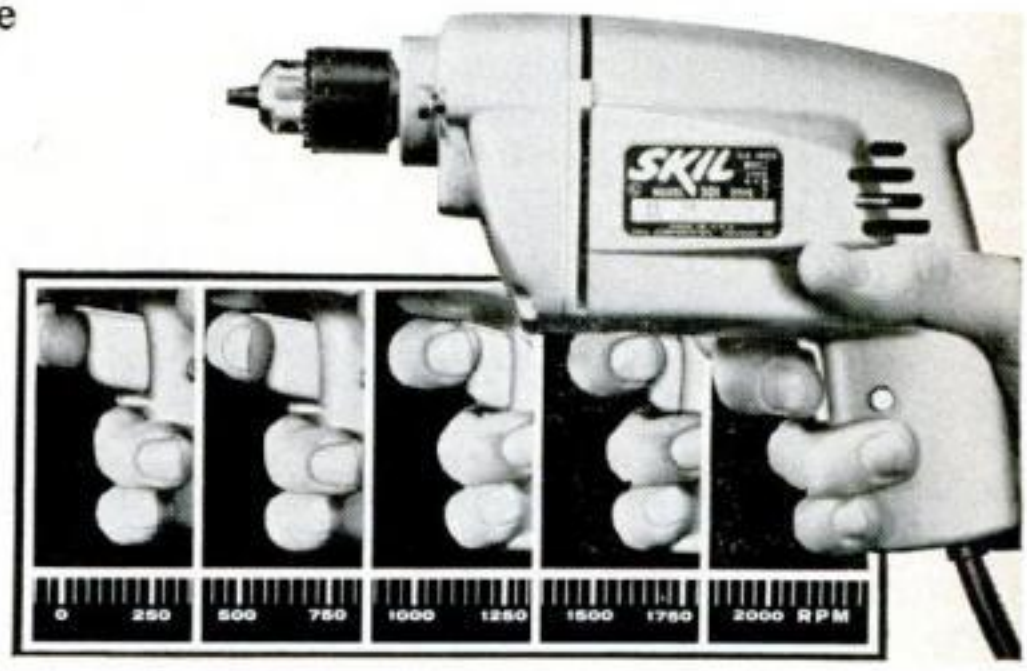
The new Skil Trigger Speed Control drill switch works like the accelerator on your car. The harder you depress it, the higher the speed, from 0 to 2,000 rpm. You match the drill speed to the material you're drilling.

Another plus! You can use the TSC drill as a precision driver, too. Simply exchange the drill bit for a driver bit, start slow to set screw, then speed up until it's snug.

There isn't a drilling or driving application you've ever tried that can't be done either faster, easier or with more accuracy with a Skil Trigger Speed Control drill.

Free offer! Carrying case, 13 accessories with Model 42501 Drill. At better hardware department stores and lumber dealers. Skil 5033 Elston Ave., Chicago, Ill. 60630.

Just squeeze the trigger for any speed from 0 to 2000 rpm.




**PICK OF THE PROS**

**SKIL**
**POWER TOOLS**



Urheberrechtlich geschütztes Material

# 'Say, Smokey–'

## A clinic on cars by America's most famous mechanic

EACH month in POPULAR SCIENCE, Smokey Yunick will answer questions on cars—family cars, high-performance jobs, hot rods, and racing cars—selected from those sent in by readers. Got a problem? Ask Smokey. You'll find the address at the end of the column. Please *print* your name and address.

►***"My four-cylinder 1962 Tempest has developed a trouble that stumps three qualified mechanics. No heat is transferred to the choke. It won't warm up and cut out. When I accelerate, the engine stalls. Everything, from the block up, has been cleaned, changed, and fussed with. Now what?" —V. H. Pansini, Centereach, N. Y.***

It's easy to tell if the heat is not getting through the tube—it will be cold to the touch. Which probably means the heat damper is not working. If the tube is hot, then the heating system from the exhaust manifold is working okay, and the trouble has to be in the choke assembly itself. It usually turns out to be improperly adjusted, or simply stuck.

►***"My '65 Comet with a 200-inch, 6.9:1 engine has a bad spark ping on regular gas. The dealer can't do anything about it. Can you?—Ray Gary, Bethpage, N. Y.***

Sounds like the timing was incorrect, or the distributor is overadvancing the engine. Check the timing, checking out the advance mechanism all through the range. If it still pings on regular, you'll have to pull the cylinder head to find out why. It could be compression, or a head gasket may extend into the combustion chamber, causing a hot spot.

►***"I own a '63 Ford with an Interceptor engine. I know that for performance, it must have the proper cam, etc., but is there anything I can do to eliminate the tappet noise? All the valves are set at .025, which I believe is correct."—Morris H. Hartman, Chattanooga, Tenn.***

Is everything in the top getting oil? If so, set the valves to factory specs on a hot, or cold, engine, with engine off. Set the exhaust valve when the intake for that cylinder starts to close. Turn the engine over, and set the intake just when the exhaust valve starts to open. If it is still noisy, not much can be done except to change cams.

►***"To move from a low altitude to 10,000 feet or more, what adjustments can be made on my '64 Dodge Dart 225-inch Slant Six to make it run and idle better?" —R. Mangus, Lakeville, Ind.***

Putting in leaner jets, using the best grade of fuel, and retarding the timing a little will help. You'll still lose some power at that altitude, and you might have to put in a lower-ratio rear end—since this is a rather small engine to begin with.

►***"A mechanic friend tells me that I should replace my original air cleaner with a 'Free Flow' on my '62 Olds 88. He says, 'The more air, the more economy.' What do you say?"—W. F. Bewley, Garden Grove, Calif.***

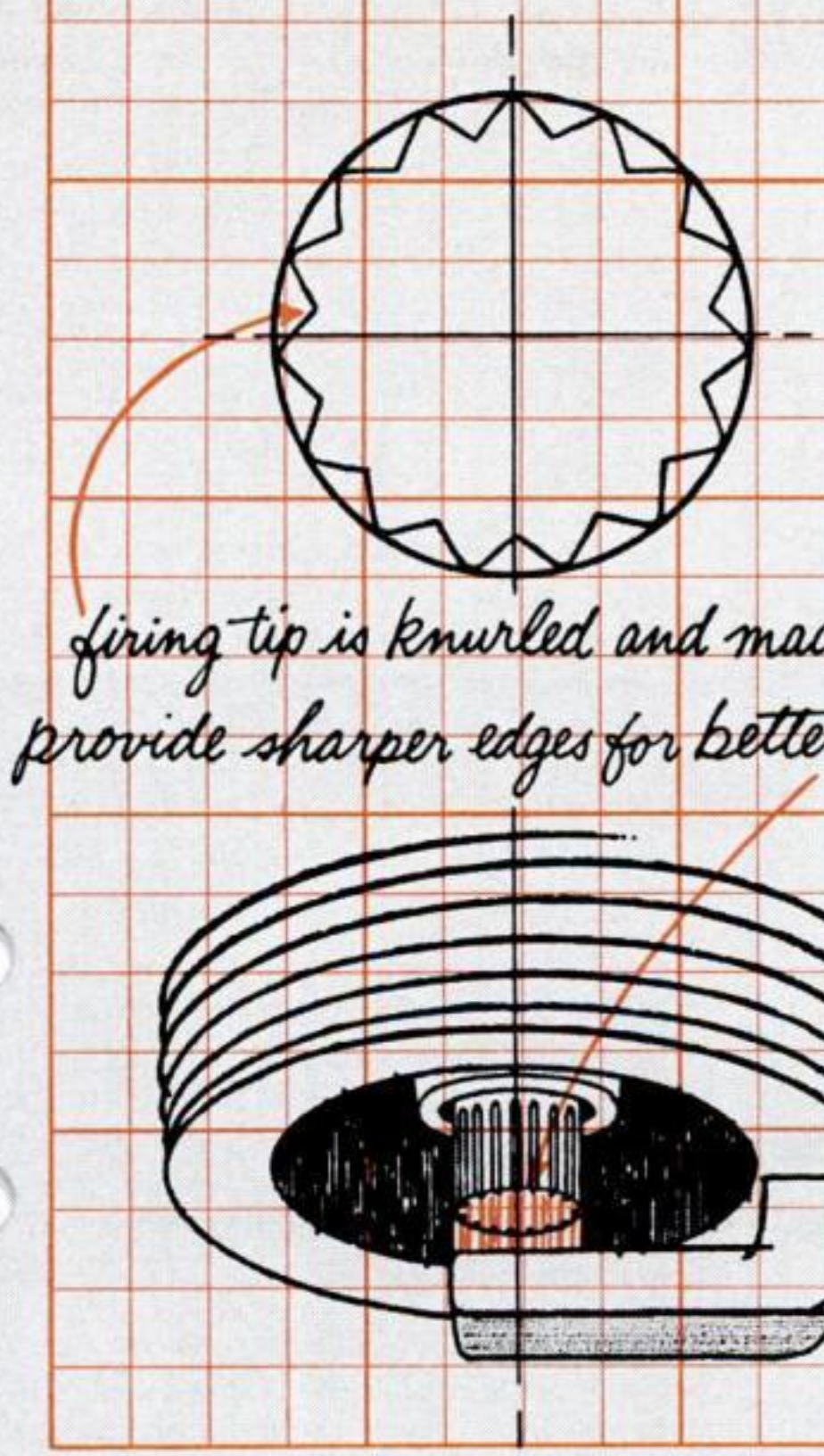
I say, "ditto." But how do you know that you have an air shortage? One sure way to find out is to get your friend to install one of his air cleaners, and try it out for one tank of gas. If you get better mileage, he makes a sale.



CONTINUED

Urheberrechtlich geschütztes Material

**From an AC engineer's notebook:**




# Here's how AC's Knurled Center Electrode helps your engine start faster

AC's Knurled Center Electrode helps you get faster starts. The knurling develops a series of sharp points around the circumference of the firing tip and each one encourages sparking. Since electricity jumps more readily from a sharp point than from a flat surface, AC Fire-Ring Spark Plugs require less voltage to produce a spark. You get quicker, more positive sparking for faster starts. This same superior "sparkability" also promotes more power, better mileage. Only AC gives this added assurance of better performance. Ask for AC Fire-Rings next time you change spark plugs.

AC

FIRE-RING
SPARK PLUGS

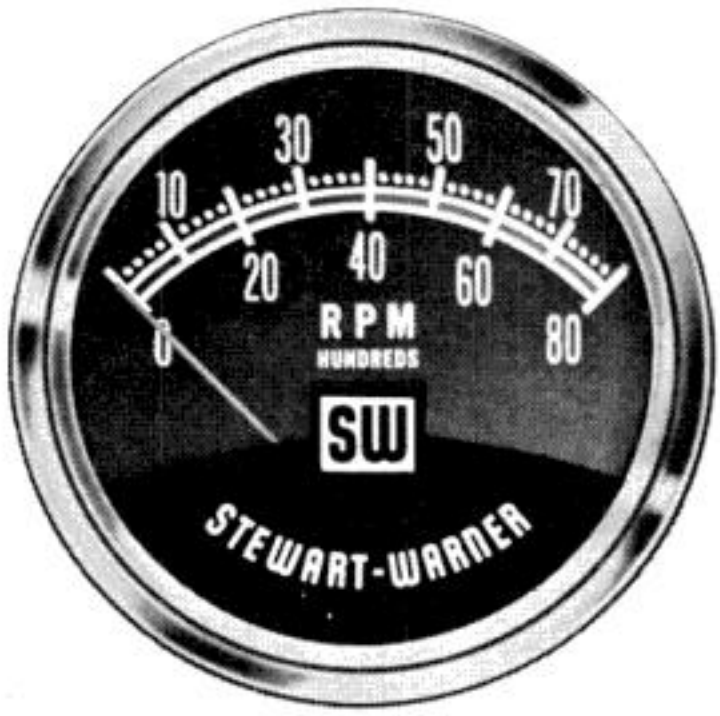
AC SPARK PLUG DIVISION OF GENERAL MOTORS



Urheberrechtlich geschütztes Material

**You've cleaned your carburetor, adjusted your spark gap and checked your timing.**

**Now let's get serious about instrumentation.**




Your engine comes out of the shop in top tune—but how can you keep it that way?

Your answer is Stewart-Warner instruments, the fast, accurate way to keep tab on engine efficiency. Stewart-Warner has electric and mechanical tachometers; speedometers; pressure, temperature and vacuum gauges; ammeters; voltmeters. Whatever your instrument need, Stewart-Warner can supply it. And you can choose from handsome S-W face dial designs like the ones below.

See your Stewart-Warner dealer. He's serious about instrumentation. No wonder. He has the most complete line in America.

**STEWART-WARNER** Symbol of SW Excellence

**INSTRUMENT** DIVISION

**Dept. D-105, 1840 Diversey Pkwy., Chicago, Illinois 60614**


## Smokey Yunick continued

►*"In the winter I have trouble starting my 1960 Rambler American, even if it has been stopped only 10 minutes. I have put on the third starter in three months."—D. Grothe, Planegg, West Germany.*

This sounds like: 1) a voltage drop caused by bad cables or connections, 2) a battery that is undersize or 3) one not at full charge because of an incorrect voltage-regulator setting, or 4) an insufficient charge to start with. An automatic choke not functioning properly can also wear out a starter in a hurry.

►*"I bought a '65 Falcon new with a 150-hp. engine. Is it true that 'Drive fast during break-in, you'll have a fast car, break it in moderate and it'll never run fast'? Also, the manual tells me to change oil every 6,000 miles, but the dealer and several mechanics say that I should change every 1,500 miles."—John F. Dapra, Sunrise, Wyo.*

That saying is simply not true. The best way to get the parts acquainted, and the high spots worn down, is to break in at moderate speeds with frequent oil changes. But don't remove the break-in oil until at least 500 miles are on the engine. Once the engine is broken in, follow the manual on oil changes.

►*"In very hot weather, or in slow, heavy traffic, my '63 F-85 Olds, 155 hp., overheats and throws out about a gallon of antifreeze. Is this characteristic of this aluminum engine, or is there a remedy?" —Saul Smith, Oak Park, Mich.*

It is not characteristic. A heavy-duty radiator will help. Keep the belts tight. The pressure cap must be tight, and as high in pressure as is recommended. If you have an air conditioner, you'll really need that big radiator and the biggest fan combination with it. Also, if the fan is automatic, be sure it's working properly.

►*"Do you know of any manufacturer who makes an updraft carburetor for V-8s to give more hood clearance in some engine swaps?"—PFC Dallas Meidlinger, APO 34.*

Weber is the only manufacturer of carbs for more clearance that I know of—and they are side-draft, not up-draft. Your car

CONTINUED



Urheberrechtlich geschütztes Material

## INTERNATIONAL CORRESPONDENCE SCHOOLS

Dept. 1144, Scranton, Penna. 18515. Please send me FREE Success Kit for the field indicated below.

**ARCHITECTURE and BUILDING TRADES**
- ☐ Air Conditioning
- ☐ Architecture
- ☐ Arch. Drawing
- ☐ Building Contractor
- ☐ Carpentry & Millwork
- ☐ Plumbing & Heating

**ART and DESIGN**
- ☐ Commercial Art
- ☐ Interior Decorating
- ☐ Sketching and Painting

**AUTOMOTIVE**
- ☐ Auto Electric Technician
- ☐ Automotive Mechanic
- ☐ Engine Tune-up
- ☐ Transmission Specialist

**BUSINESS**
- ☐ Accounting
- ☐ Cost Accounting
- ☐ Bus. Administration
- ☐ Executive Training
- ☐ Marketing
- ☐ Personnel-Labor Rel'ns
- ☐ Programming for Digital Computers
- ☐ Purchasing Agent
- ☐ Real Estate
- ☐ Salesmanship
- ☐ Sales Mgmt.
- ☐ Small Business Mgmt.
- ☐ Traffic Mgmt.

**CHEMICAL**
- ☐ Chem. Engineering
- ☐ General Chemistry
- ☐ Lab. Technician
- ☐ Nuclear Energy
- ☐ Plastics ☐ Pulp, Paper

**CIVIL ENGINEERING**
- ☐ Civil Engineering
- ☐ Highway Engineering
- ☐ Structural Blueprints
- ☐ Sanitary Engineering
- ☐ Structural Engineering
- ☐ Surveying & Mapping

**DRAFTING**
- ☐ Architectural
- ☐ Drafting Technology
- ☐ Electrical—Electronic
- ☐ Mechanical

**ELECTRICAL**
- ☐ Appliance Servicing
- ☐ Electrical Engineering
- ☐ Elec. Motor Repairman
- ☐ Instrument Technician
- ☐ Practical Electrician
- ☐ Practical Lineman
- ☐ Telemetering

**ELECTRONICS**
- ☐ Automation
- ☐ Electronic Computers
- ☐ Electronics Technician
- ☐ General Electronics
- ☐ Industrial Electronics

**ENGINEERING (Professional)**
- ☐ Chemical ☐ Civil
- ☐ Electrical ☐ Mechanical

**ENGLISH and WRITING**
- ☐ Business Writing
- ☐ Technical Writing
- ☐ Practical English

**HIGH SCHOOL (Diploma)**
- ☐ High School Business
- ☐ High School General
- ☐ High School Math
- ☐ High School Secretarial
- ☐ High School Vocational
- ☐ College Preparatory

**LANGUAGES**
(Edited by Berlitz)
- ☐ French ☐ German
- ☐ Italian ☐ Spanish

**MECHANICAL and SHOP**
- ☐ Gas-Elec. Welding
- ☐ Industrial Engineering
- ☐ Ind. Instrumentation
- ☐ Machine Design
- ☐ Machine Shop Practice
- ☐ Mech. Engineering
- ☐ Safety Engineering
- ☐ Shop Blueprints
- ☐ Toolmaking

**SECRETARIAL**
- ☐ Clerk-Typist
- ☐ Legal Secretary
- ☐ Medical Secretary
- ☐ Professional Secretary
- ☐ Shorthand
- ☐ Stenographic ☐ Typist

**STEAM and DIESEL POWER**
- ☐ Boiler Inspector
- ☐ Power Plant Eng.
- ☐ Stationary Engineering

**SUPERVISION**
- ☐ Foremanship—Suprv'n
- ☐ Personnel—Lab. Rel'ns

**TV-RADIO**
- ☐ Radio and TV Servicing
- ☐ Radio-Tele. License

**MISCELLANEOUS**
- ☐ Textile
- ☐ Other (please specify)

Name_____
(Indicate Mr., Miss or Mrs.)

Address_____

City_____ State_____ Zip Code_____

Occupation_____ Employed by_____

Working Hours_____ A.M. to_____ P.M.

Clip coupon here – and take your first big step to real success! Accredited Member, National Home Study Council

# UNLOCK YOUR GENIUS FOR MAKING MONEY

No matter what you are doing . . . or want to do. No matter your education or experience. You have a hidden Genius for making more money. Maybe really *big* money.

Give your Genius a chance. Give it *knowledge*. Do it *now*.

Mail the card (or the coupon) above. It will put you in touch with the most respected home-study institution in the world —International Correspondence Schools.

Spare-time study with I. C. S. can bring any one of hundreds of careers within your grasp. Every course is a hardheaded, practical study of its subject which prepares you to move ahead in the field. You get training that's worth *money* . . . training that will let you move ahead *faster*.

Pick your field of interest *right now*. Then fill out the card and mail it. I. C. S. will send you three valuable booklets, absolutely FREE. They tell all you need to know to set loose *your* Genius for making more money!

The Genius is there, within you. But it can't go to work without help. Unlock *your* Genius. Mail the card or coupon *now*.

Special low rates to members of U. S. Armed Forces. Special training programs for industry. New WICS package for women.

ICS
75th YEAR



Urheberrechtlich geschütztes Material

ARROW®
All-Purpose
STAPLE GUN TACKERS
HEAVY DUTY

Model T-50 ONLY $12.50
OTHER MODELS FROM $4.95
TAKES 6 STAPLE SIZES: 1/4", 5/16", 3/8", 1/2", 9/16" and CEILTILE
SHOOT
A STAPLE WHEREVER YOU'D DRIVE A NAIL!
FASTER! CHEAPER! BETTER!
for 1001 Home Improvement Fastening Jobs:
Ceiling Tile, Insulating, Upholstering, Screening, etc.

UPHOLSTERING
CEILING TILE
INSULATING
Available at hardware, lumber, building supply, stationery and other retail outlets.
ARROW FASTENER CO., INC.
One Junius Street • Brooklyn 12, N. Y.

# Smokey Yunick continued

will be faster, but this is an expensive way to gain these advantages.

►*"My '61 Rambler Classic, with automatic, developed a drive-line vibration at 30 to 50 m.p.h. The universal joint has been replaced, the drive shaft balanced, and a set of new, dynamically balanced tires installed without effect. Any suggestions?" —H. C. Riggs, Falls Church, Va.*

Make sure your engine mounts are in good shape and tight. Next, check the rear-axle mountings and alignment, since the axle may be out of line. Also, check the rear transmission bushings, or bearings, for excessive wear.

►*"Ever since it was new, my '63 Plymouth Fury wagon has had a 'clunk' when put in forward or reverse. After everybody else had a shot at it, a factory rep gave the car a torture test. He locked the brakes and rolled it back and forth. He said the noise was caused by a floating brake shoe, and that nothing could be done about it because it was an inherent weakness in the product. Was he right?"—T. B. King, Tucson, Ariz.*

He could be right on your particular car, not for '63 Fury wagons in general. However, I've heard that same noise when it turned out to be the yoke in the drive line. This yoke compensates for changes in drive-line length when the rear axle moves back and forth. The yoke is part of a spline joint which, when too tight, locks and unlocks suddenly from engine torque. This could be fixed by freeing up the splines, or working on the engine mounts to give the yoke more freedom.

►*"I hear wire wheels are dangerous in hard corners and can never be balanced properly. Is this true?"—Rich Jarman, Sarasota, Fla.*

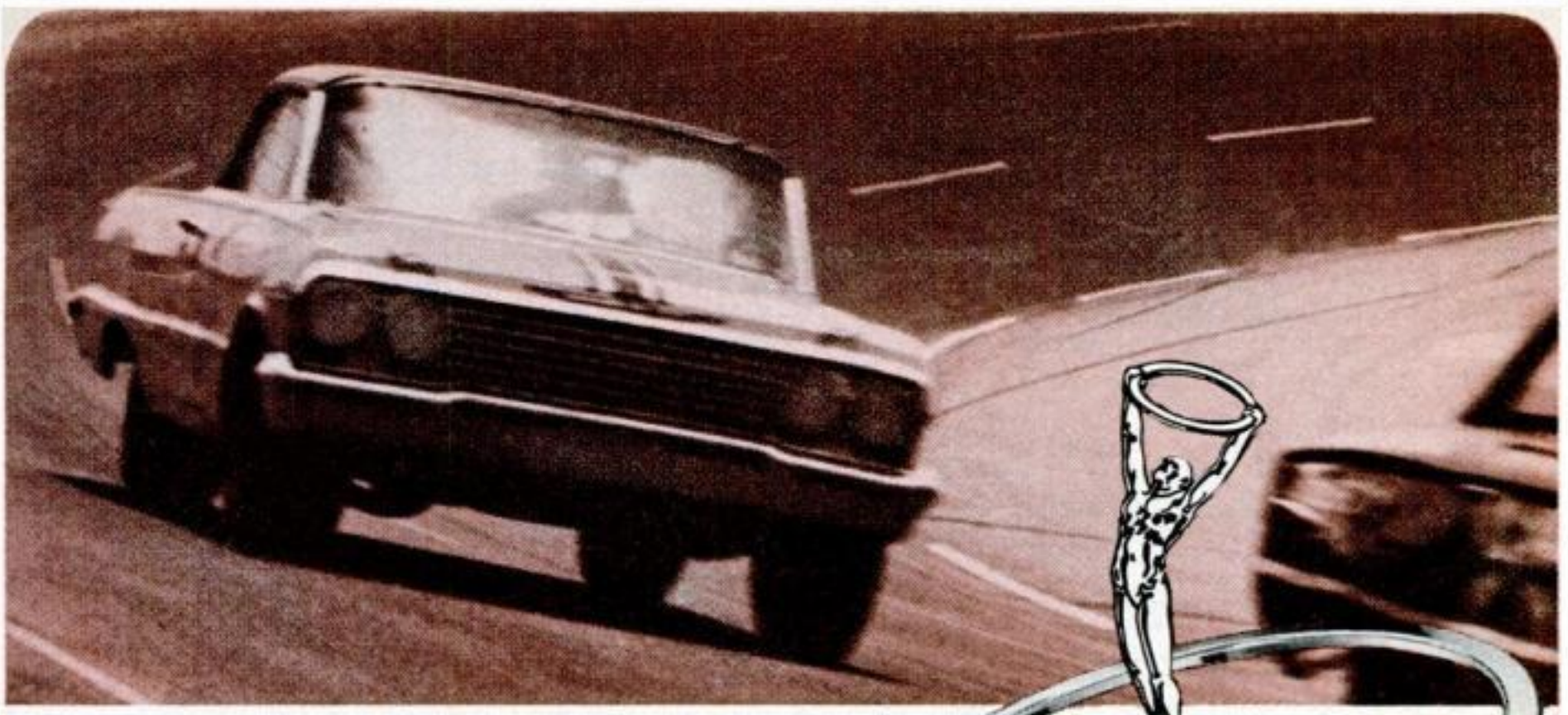
Yes. If you want to be different *and* safe, get some magnesium, or aluminum, wheels—and get a good brand in those.

• • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • •

Got a question on autos? Send it to:
"Say, Smokey—" POPULAR SCIENCE
355 Lexington Ave., New York, N.Y. 10017.
Not every question may be used. Questions cannot be answered by individual letters.



Urheberrechtlich geschütztes Material

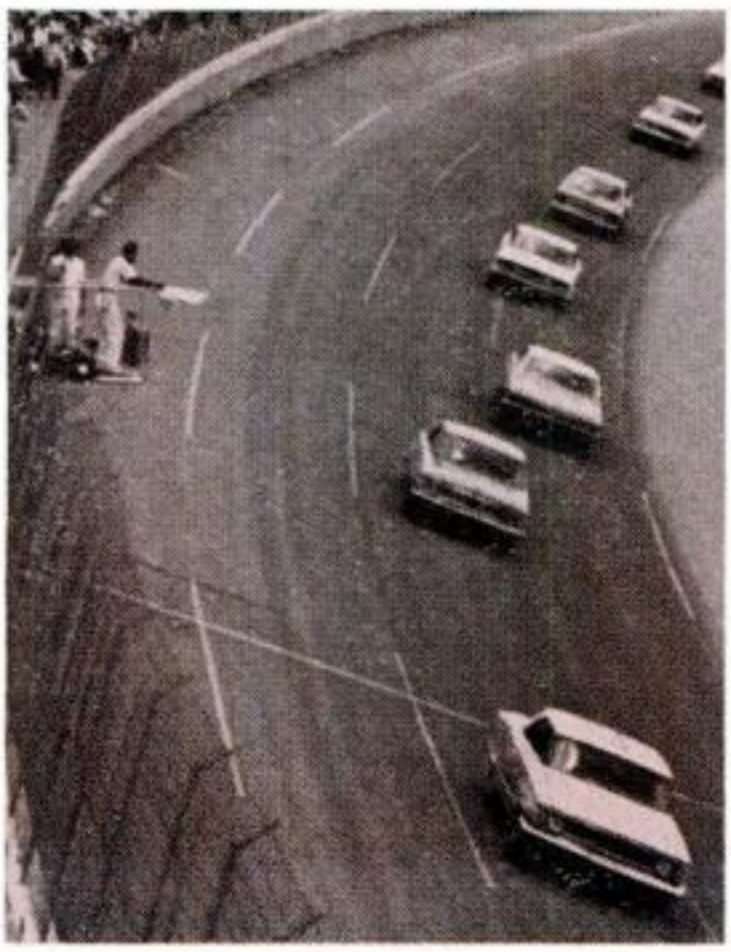


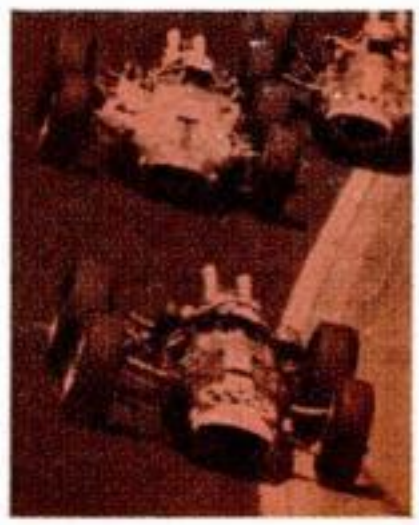
## MORE 1965 USAC AND NASCAR WINNERS USED PERFECT CIRCLE PISTON RINGS THAN ALL OTHER BRANDS COMBINED

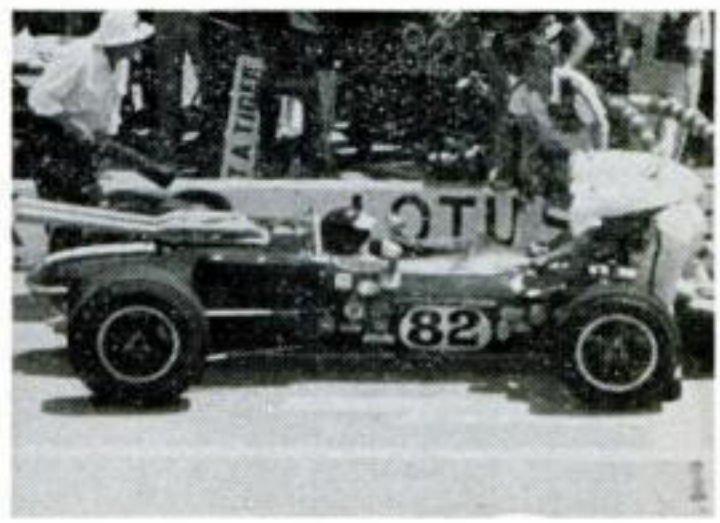
It happens year after year. Men who make their living at racing select their engine parts to assure peak performance from start to finish. When it comes to piston rings, they almost always choose Perfect Circle. And the PC piston rings they use are not specially made for racing. They are standard sets — the same kind you can install! To maintain top engine efficiency in *your car*, insist on Perfect Circle next time you re-ring.

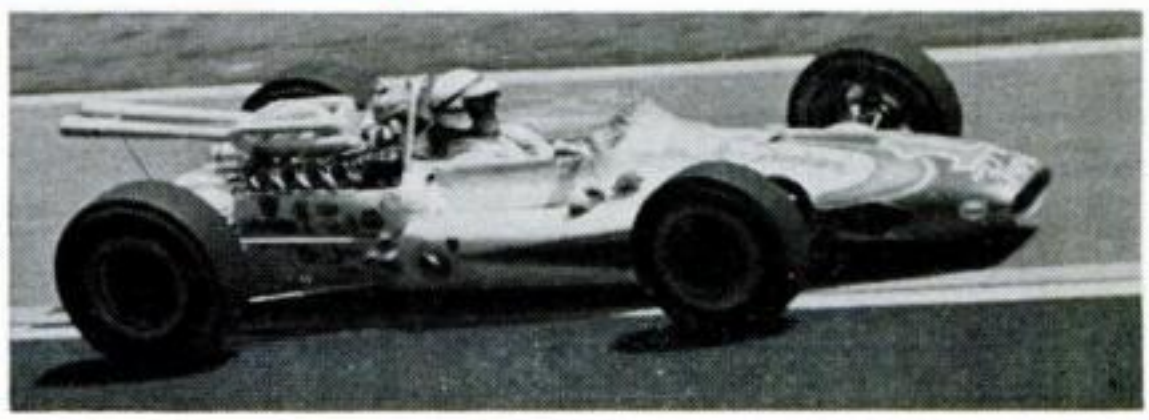
# PERFECT CIRCLE

DANA PARTS COMPANY — DANA — DANA CORPORATION









Urheberrechtlich geschütztes Material

KEEP PACE WITH SPACE AGE! SEE MANNED MOON SHOTS, SPACE FLIGHTS, CLOSE-UP!

# AMAZING SCIENCE BUYS for FUN, STUDY or PROFIT

## See the Stars, Moon, Planets Close Up!
## 3" ASTRONOMICAL REFLECTING TELESCOPE
**60 to 180 Power—Famous Mt. Palomar Type! An Unusual Buy!**

Equatorial Mount with lock on both axes. Aluminized and over-coated 3" diameter high-speed f/10 mirror. Telescope comes equipped with a 60X eyepiece and a mounted Barlow Lens. Optical Finder Telescope included. Hardwood, portable tripod. FREE with Scope: Valuable STAR CHART plus 272-page "HANDBOOK OF HEAVENS" plus "HOW TO USE YOUR TELESCOPE" BOOK.

**Stock No. 85,050-N .....$29.95 Postpaid**

## 4¼" Astronomical Reflector Telescope!
255 Power. New Vibration-Free Metal Pedestal Mount.
**Stock No. 85,105-N .....$79.50 F.O.B.**

### Superb 6" Reflector Telescope
Up to 576 Power Equatorial mount and Pedestal Base
**Stock No. 85,086-N.....$199.50 F.O.B.**

## OPAQUE PROJECTOR

Projects illustrations up to 3" x 3½" and enlarges them to 35" x 30" if screen is 6½ ft. from projector; larger pictures if screen is further away. No film or negatives needed. Projects charts, diagrams, pictures, photos, lettering in full color or black-and-white. Operates on 115 volt, A.C. current. 6-ft. extension cord and plug included. Operates on 60-watt bulb, not included. Size 12" x 8" x 4½" wide. Weight 1 lb., 2 oz. Plastic case with built-in handle.

**Stock No. 70,199-N.....$7.95 Postpaid**

**OPAQUE PROJECTOR with KALEIDOSCOPE ATTACHMENT**
Same unit as above, but provides endless additional projects with everchanging kaleidoscope patterns.
**Stock No. 70-714-N .....$10.00 Ppd**

## SOLVE PROBLEMS! TELL FORTUNES! PLAY GAMES!
## NEW WORKING MODEL DIGITAL COMPUTER
### ACTUAL MINIATURE VERSION OF GIANT ELECTRONIC BRAINS

Fascinating new see-through model computer actually solves problems, teaches computer fundamentals. Adds, subtracts, multiplies, shifts, complements, carries, memorizes, counts, compares, sequences. Attractively colored, rigid plastic parts easily assembled. 12"x3½"x4¾". Incl. step-by-step assembly diagrams, 32-page instruction book covering operation, computer language (binary systems), programming, problems and 15 experiments.

**Stock No. 70,683-N .....$5.98 Postpaid**

## Binocular-to-Camera Holder
### *Will Fit Any Camera*

Bring distant objects 7 times nearer with a 35mm camera. 7x50 binocular and our NEW CAMERA-TO-BINOCULAR HOLDER. Ideal for long range photos of wildlife, ships, people, planes, etc. Camera and binocular attach easily. Use any binocular or monocular—any camera, still or movie. Take color or black and white shots. Attractive gray crinkle and bright chrome finish. 10" long. Full directions for taking telephotos.

**Stock No. 70,223-N .....$11.50 Postpaid**

## WAR SURPLUS ELECTRIC GENERATOR

Brand new Signal Corps Electric Generator for scientific experiments, electrical uses, demonstrations. Generates up to 90 volts by turning crank. Use in high impedance relays. Charge ground and bring up night crawlers for bait or study. 2 Amico Magnets alone worth original price. Wt. 2 lbs. Cost to Govt. $15.

**Stock No. 50,225-N .....$6.95 Postpaid**

Same type generator, mounted, with light, as electricity demonstrator.
**Stock No. 50,365-N .....$11.95 Postpaid**

### *MAKE YOUR OWN POWERFUL ASTRONOMICAL TELESCOPE*

Kits contain fine annealed pyrex mirror blank, abrasives, diagonal mirror and eyepiece lenses. You build instruments ranging in value from $75.00 to hundreds of dollars.

| Stock No. | Diam. | Mirror Thickness | Price | |
|---|---|---|---|---|
| 70,003-N | 4¼" | ¾" | $ 7.50 ppd. | |
| 70,004-N | 6" | 1" | 11.95 ppd. | |
| 70,005-N | 8" | 1⅜" | 19.50 ppd. | |
| 70,006-N | 10" | 1¾" | 30.75 | f.o.b. |
| 70,007-N | 12½" | 2⅛" | 59.95 | Barrington |

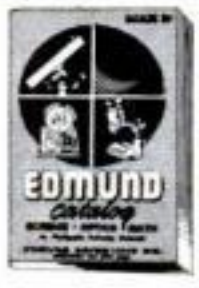
## MAIL COUPON for FREE CATALOG "N"

**EDMUND SCIENTIFIC CO., Barrington, N.J.**
**Completely New 1966 Edition. 148 Pages.**
**Nearly 4000 Unusual Bargains**
Please rush Free Giant Catalog-N.

Name.....

Address.....

City.....Zone.....State.....




## 'FISH' WITH A WAR SURPLUS MAGNET
### *Go Treasure Hunting On The Bottom*

Great idea! Fascinating fun and sometimes tremendously profitable! Tie a line to our 5-lb. Magnet—drop it overboard in bay, river, lake or ocean. Troll it along the bottom—your "treasure" haul can be outboard motors, anchors, fishing tackle, all kinds of metal valuables. 5-lb. Magnet is war surplus—Alnico V Type—Gov't. Cost, $50. Lifts over 150 lbs. on land—much greater weights under water. Order now and try this new sport.

**Stock No. 70,571-N 5 lb. Magnet.....$12.50 Postpaid**
**Stock No. 70,570-N 3½ lb. Lifts 40 lbs.....$8.75 Postpaid**
**Stock No. 70,572-N 7½ lb. Lifts 175 lbs.....$18.75 Ppd.**
**Stock No. 85,152-N 15 lb. size, lifts 350 lbs.....$33.60 FOB**

## WOODEN SOLID PUZZLES

12 Different puzzles that will stimulate your ability to think and reason. Here is a fascinating assortment of wood puzzles that will provide hours of pleasure. Twelve different puzzles, animals and geometric forms to take apart and reassemble, give a chance for all the family, to test skill, patience, and best of all to stimulate ability to think and reason while having lots of fun.

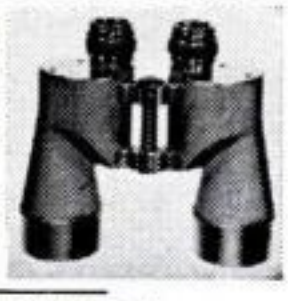
**Stock No. 70,205-N .....$3.00 Postpaid**

### EXPLORE THE FASCINATING WORLD OF MAGNETISM
## NEW 15 MAGNET SAMPLER KIT
### 11 Shapes! Many Compositions!

Ever ripen tomatoes by magnetism—paint pictures using magnet as a brush and iron filings as paint? Surprising new ideas and uses for the bewildering forces of magnetism are continually discovered. Here, in one low-cost kit, you can learn and experiment with varied materials that obsoleted Magnetite—the natural magnetic ore. Terrific assortment includes ferrites, ceramics, flexible rubber, alnico in every shape imaginable—up to 20 lbs. pull. Used every day in the modern wonders of magnetic microphones . . . magnetic processing of bank checks . . . memory cores for electronic computers, flow meters, immense generators, transformers, motors, etc. All kinds of practical everyday uses, too. Make tool and knife holders, pick-up tools, bulletin boards, automatic stirrers, magnetic games and puzzles. Your own ingenuity can produce dozens of innovations—perhaps patentable. Sizes range from ¾" x 7/16" x 7/16" to 3" x 3" x 1/32". Incl.: alnico w/handle, U-shaped alnico, three—2 sided ceramic, flexible strip, alnico bar, ceramic, alnico disc w/center hole, 2 lg. alnico cyl.; sm. cyl.; flex. sheet, 2 baby alnico bars, 3 channel-type pole pieces for sm. ceramic magnets, bar magnet keeper, 2 disc magnet keepers, compl. info. and inst.

**Stock No. 70,780-N.....$5.00 Postpaid**

## WAR SURPLUS AMERICAN-MADE 7x50 BINOCULARS



Big savings! Brand new! Crystal clear viewing—7 power. Every optical element is coated. An excellent night glass—the size recommended for satellite viewing. Individual eye focus. Exit pupil 7mm. Approx. field at 1,000 yds. is 376 ft. Carrying case included. American 7 x 50's normally cost $274.50. Our war surplus price saves you real money.

**Stock No. 1544-N.....Only $78.40 Ppd.**
**8 x 30 Binoculars**—similar to above.
**Stock No. 963-N.....$40.00 Postpaid**
**7 x 35 American Made Binoculars.**
**Stock No. 964-N.....$55.00 Ppd.**

## BRAND NEW, INDUSTRIAL SURPLUS
## NICKEL-CADMIUM CELLS AND BATTERIES
### BUY OF THE YEAR!

These hard-to-get, light-weight, 1.2V nickel-cadmium cells in rugged nylon cases have 4-amp. hour capacity. Hundreds of uses for hobbyists, amateur photographers, campers, model builders, etc. By connecting cells in series, you can make battery of any voltage in multiples of 1.2V. Excellent for rechargeable portable lanterns; cycle, scooter, bicycle, and boat lights; camp lights; portable fluorescent and ultraviolet lights; electronic flash units. Model buffs will find cells perfect for powering model boats, cars, etc. Cells have almost *unlimited* life, will undergo thousands of discharge-charge cycles with practically no deterioration. Quick charge—½ hour with proper equipment. Minimum maintenance: just add a few drops of water each year. Small amount of electrolyte used; cell sealed to prevent loss. Delivers almost 100% of output at below freezing temperatures where output is reduced 50% in lead-acid cells. No corrosive fumes given off under any stage of recharge. Can't be damaged by accidental charging in reverse (but not recommended). Cell meas. 6" x 2" x ½" thick. 6½ oz. Stud-type terminals on top 1⅛" apart, marked for polarity; 6-32 thread, nuts and lock washers.

**ONE 1.2 VOLT NICKEL-CADMIUM CELL**
**Stock No. 40,798-N .....$3.95 Ppd.**
**ONE 6-VOLT NICKEL-CADMIUM BATTERY.** 5-cells in stainless steel, strap-type casing. Convenient power source for Edmund's war surplus sniperscope (No. 85,157). 6" x 2" x 4". Wt. approx. 2 lbs.
**Stock No. 70,776-N .....$15.00 Ppd.**
**ONE 7.2-VOLT NICKEL-CADMIUM BATTERY COMPLETE WITH CHARGER KIT.** Assemble your own portable battery power supply with built-in charger. Excellent for portable movie light. Six-cell battery in stainless steel, strap-type casing; 12-volt transformer; charger circuit board consisting of rectifier and automatic regulating circuit (transistorized) which protects against overcharging of battery. Complete with wire, switch, line cord, hardware and instructions. 6" x 6" x 2". Wt. approx. 2 lbs.
**Stock No. 70,777-N .....$25.00 Ppd.**

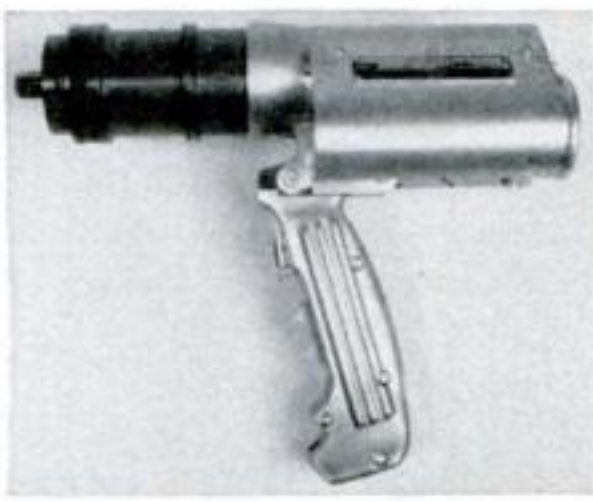
ORDER BY STOCK NUMBER . SEND CHECK OR MONEY ORDER SATISFACTION GUARANTEED
**EDMUND SCIENTIFIC CO., BARRINGTON, N. J.**



Urheberrechtlich geschütztes Material

# SCIENCE *Newsfront*

BY WALLACE CLOUD, PS SCIENCE EDITOR



## Spin-free space power tool is ready for Gemini test

You don't notice it on earth, but when you turn on a power tool, the shaft turns in one direction and the motor casing wants to turn in the opposite direction. In the weightlessness of space, this "reactive torque" would put you in a spin, since you wouldn't be anchored by gravity.

Keeping spaceworkers from spinning is one of the problems of engineers engaged in developing methods of repairing and assembling satellites in the void.

Under an Air Force contract, the Martin Company and the Black & Decker tool firm have developed the first "zero-reaction" power tool, shown above. The photo at right shows how the handle of the tool folds. The space tool has been delivered to the Air Force for a try-out during a space walk in an upcoming Gemini flight.

How does it work? The battery-powered motor doesn't deliver power directly to the shaft. Instead, the armature and motor casing turn freely in opposite directions, winding up a spring between them (inside the black cylinder, which is an extension of the motor casing). The spring lets go intermittently, delivering a kick to the shaft.

The tool's reactive torque is only 1/1,200 of its output power, so it's considered to have virtually zero reaction. Interchangeable heads snap onto the shaft for various jobs. In the Gemini trial, the tool will be used to unscrew and rescrew test-panel bolts.

## U.S.-made heart pacers safe from neon signs

Recent reports that heart pacemakers are thrown out of whack by neon signs, diathermy machines, and other electronic devices have been branded as a false alarm for the 10,000 U.S. heart patients who are fitted with the life-saving gadgets.

The U.S. Public Health Service's National Health Institute says the implantable electronic pacemakers manufactured in the United States have been tested repeatedly and are not subject to radio-frequency interference.

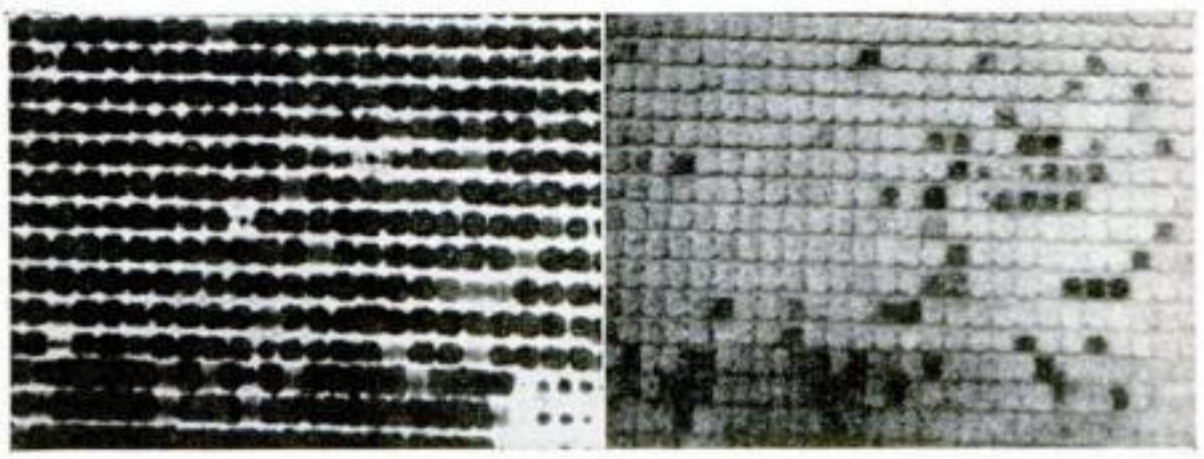
The danger to pacemaker users, first reported in a British medical journal, applies only to two pacemakers of foreign manufacture, says the Heart Institute.

## Vietnam jungle diseases create a doctors' dilemma

If the Vietcong don't get you, take your pick between blackwater fever and malaria. That's a thought for the troops in Vietnam from an official of the U.S. National Institutes of Health.

"We are shaking in our

CONTINUED



## Infrared photography spots diseased trees

In dual aerial photos of a Florida citrus grove, taken simultaneously, diseased trees show up in right-hand photo, shot on infrared film. Why? Metabolism of a diseased tree is slowed and it generates less heat. The technique is being tested by Florida agriculture authorities.



Urheberrechtlich geschütztes Material

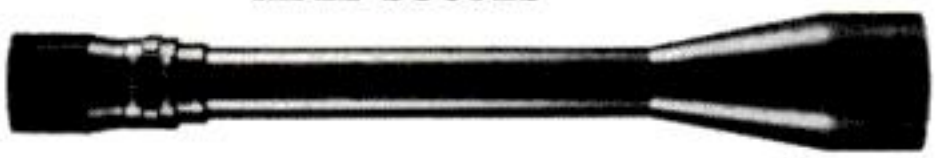
# JAR IT! THEN USE IT!

**SUPER TOUGHNESS AND B&L QUALITY AT $49.95**

To test a mount **you** would never take swings at this fine new scope with a hammer but **we** did — repeatedly — to be sure that the mount maintains zero, even under toughest handling and strongest recoil! Where other scopes would be right off target, the new V-design of B&L mounts keeps scopes continually in zero, even when switched from one rifle to another! We not only jarred them . . . we scraped them, froze them, baked them, soaked them and dropped them. They performed beautifully after all this torture. Here's the kind of scope you've wanted for years — a wonderful combination of the finest American-made instrument quality, and hard, tough design at new low prices. New alloys, new lubricants, and new production methods have made it possible to give you scopes that stay in mint condition for a lifetime. You can't buy better optical or mechanical quality at any price. Your dealer can tell you why the shooting world is so excited about these new B&L scopes. There's a 2½X or 4X at $49.95, 2½X to 5X at $79.95, and a 2½X to 8X at $99.95. For 85-page manual, "Facts About Telescopic Sights", send 25¢ to Bausch & Lomb Incorporated, Rochester, New York 14602.

**BAUSCH & LOMB**

**RIFLE SCOPES**




## Science newsfront continued

boots," said Dr. G. Robert Coatney of the National Institute of Allergy and Infectious Diseases, Bethesda, Md., in a recent interview.

GIs in the jungles of Vietnam have been hit by a strain of malaria resistant to all drugs except quinine, he explained. But quinine makes malaria victims susceptible to blackwater fever, an acute kidney infection that is often fatal. The victim's urine, says Dr. Coatney, "comes out black as tar."

Is there a cure for blackwater fever? "Sure. Take 'em off quinine." That's the dilemma faced by the doctor in the field hospital. "If he thinks the GI is in good enough physical condition to throw off the malaria by himself, he may withdraw quinine and not risk the fever. It's up to him."

There is no drug in sight that can replace quinine against the strain of malaria being encountered in Vietnam. "We are working desperately in hopes of a new drug," said Dr. Coatney.

### Smog death for mankind?

Humanity will become extinct in 100 years through suffocation by smog, forecasts a UCLA professor.

Dr. Morris Neiburger, professor of meteorology and a former president of the American Meteorological Society, sees little prospect that the burning of coal, gas, and petroleum products—especially in car and truck engines—can or will be controlled.

"All civilization will pass away, not from a sudden cataclysm like a nuclear war, but from gradual suffocation in its own wastes," he said.

A crucial factor would be the smog that would accumulate if 800 million Chinese drove automobiles burning gasoline. "This isn't too imaginative," Dr. Neiburger said. "Everybody in Los Angeles drives a car, and as the living standards of the rest of the world rise, all the Chinese, Indians, and Africans will demand and get the same freedom of moving about that Americans and Europeans have."

The more obvious forms of air pollution are still local or regional problems, but evidence is accumulating that changes in the atmosphere, such as an increase in carbon dioxide content, are taking place on a world scale.

Because the prospect of a polluted world

CONTINUED



Urheberrechtlich geschütztes Material

# "Get the message your plugs give you"

## *says Parnelli Jones, 1963 Indianapolis winner*

Every time you pull the spark plugs from your engine, look 'em over. They can tell you a lot about the engine's condition.

If you find one or two plugs, say, fouled by wet, sludgy deposits, suspect worn rings or pistons or too much clearance between valve stems and guides for those cylinders. Worn or loose bearings are another possibility. Burned or overheated plugs—with white, burned or blistered noses and eroded electrodes—generally indicate inefficient engine cooling, overheating due to wrong ignition timing or a need for "colder" plugs. If just a couple show that condition, however, the trouble might be as simple as loose plugs!

It's mighty important to tighten plugs properly. Do it with a torque wrench. Here's a table that shows the amount of torque for different plugs:

| Plug Hex. Size | Thread Size | Correct torque in foot-pounds | |
|---|---|---|---|
| | | Cast iron heads | Aluminum heads |
| 5/8" | 10MM | 15 | 10 |
| 13/16" | 14MM | 30 | 25 |
| 7/8"* | 18MM | 40 | 35 |
| 15/16" | 7/8"-18 | 45 | 40 |

*13/16" with tapered seat—torque to 15 to 20 ft.-lbs.

In a pinch, use a ratchet wrench with short handle and tighten each plug about ¾ of a turn after plug begins to compress the gasket.

It's mighty important to use high-quality plugs, too. I like Autolites. Autolite heat-seals every plug it makes, fusing the center electrode to the insulator under tremendous heat and pressure to prevent compression leakage. Nearly everyone does this with racing and aircraft plugs. But not everyone does it with regular passenger-car plugs. Autolite thinks the extra protection is worth it. I think so, too.

**AUTOLITE SPARK PLUGS**

A PRODUCT OF Ford

**HERE ARE SOME OF PARNELLI JONES' RACING ACCOMPLISHMENTS:** Indianapolis 500—Winner, 1963; top qualifier, 1963, 1962; Pikes Peak—Stock Division champion, 1964, 1963; Milwaukee—Seven stock car wins and a USAC 200-mile championship victory in past two years!; Trenton—Winner, USAC 200-miler, 1964; Riverside—Winner 200-mile Sports Car Grand Prix, 1964 (his 1st sports car race!).



Urheberrechtlich geschütztes Material

**Syrup is for pancakes.**
***(and tenderfoot pipesmen)***

Revelation is for pipe smokers who're tired of sweet, syrupy blends. You get the rich *naturally* mellow flavor of five great tobaccos. It's a taste you can stick with all day long.

**Revelation is for the experienced pipe smoker.**

**20 COURSE HOME STUDY PROGRAM**

**KARATE! JUDO**

**BOXING! MUSCLEBUILDING! YOGA! STRONGMAN STUNTS! STRENGTH & ENDURANCE! HANDBALANCING! ETC.**

YOU GET ALL THESE! ●20 illustrated KARATE blows ●SAVATE foot fighting ●Secret NERVE CENTER and ANATOMY charts ●20 lethal JUDO throws ●20 terrific STRONGMAN STUNTS ●Complete MUSCLE-BUILDING program ●Ancient YOGA secrets ●HANDBALANCING stunts ●Complete BOXING program ●Secrets of ENDURANCE ●TENSION-FLEX COURSE ●FITNESS EXERCISES ●KEEP FIT PROGRAM ●K MAN DUMMY. No C.O.D.'s. Canadians 75c. You Get The LOT.....

**FOR ONLY 50¢**

**FREE K-MAN KARATE PRACTICE DUMMY**

**HOME GYM & EQUIPMENT PLANS**
Build gym equipment: Vault Horse, Rowing Machine, Boxing Ring etc. Convert basement, garage to gym. ONLY 50c with courses. TOTAL $1.00.

**OXFORD STUDIO,** 146 Blake St. (PS4) Mattapan, Mass.
NAME (print) .....
Address .....
City ..... State.....

50c PROGRAM
$1.00 with Gym

## Science newsfront continued

atmosphere is so unpleasant, people will refuse to face it until too late, Dr. Neiburger thinks. "Mankind will sink to its smoggy doom through inertia and irresponsibility," he said. One optimistic note: Automobiles powered by a bank of batteries, instead of a gasoline tank, could save the world.

### Why spacemen need strong hearts

During the first U.S. walk in space, Gemini astronaut Edward White's pulse averaged 150 beats per minute, reaching a peak of 178 just before he got back into the spacecraft.

Only a few years ago doctors had hardly any experience with pulse rates of over 100 except in the very sick, and aerospace medics were flabbergasted to find that pilots of the X-15 rocket plane had rates of more than 170 at times.

A test pilot's heart can thump even faster: Recently, in a NASA-Air Force research program at Edwards Air Force Base, Calif., one pilot of the wingless M-2 glider, or "flying bathtub," registered a sustained pulse rate of 188. The same man had a pulse of only 89 while piloting an F-104 jet.

An objective of the research is to find out why such rapid pulse rates occur. Is it because the man is afraid? On the contrary, the doctors think the cause is responsibility rather than risk—the pilot's heart is helping him cope with an emergency.

This theory was supported by data recorded in a series of 37 hot-rodding flights of a two-seat high-performance plane, in which one pilot did all the flying and a passenger pilot had nothing to do. The command pilot, who appeared calm and confident, typically had a pulse of about 150. The passenger, who was likely to be quite nervous, had a rate of about 90.

### MSD epidemic sweeps medical schools

Nearly four out of five medical students suffer from "MSD" (medical students' disease), according to University of Southern California psychiatrists. The ailment consists of imaginary symptoms of diseases being studied. The student is likely to learn more about the disease he thinks he has, the psychiatrists say, but MSD may be a sign of a need for psychiatric treatment, since it's a reaction to the pressure and responsibility of medical school. ■ ■



Urheberrechtlich geschütztes Material

PROFITS • TRIMMING TREES • CLEARING LAND •
TS • BUILDING A CABIN • PRUNING ORCHARDS
CES • CUTTING FIREWOOD • BUILDING A
G OUTDOOR FURNITURE • BLAZING A TRAIL

# On July 1, 1965, the new McCulloch MAC-10 Series made every other lightweight chain saw overweight and out-of-date

**MAC 1-10:** The world's lightest direct drive chain saw. **10½ lbs.***

**MAC 2-10:** World's lightest automatic oiling chain saw. **10¾ lbs.***

If you know you need a chain saw to do any of the hundreds of wood cutting jobs one can do, now's the time to act. And if you've never thought about owning a chain saw, it's time to find out how handy a new, fast-cutting MAC-10 Series chain saw is to have around. Up to a quarter lighter than other lightweights, but dependable and powerful like all McCullochs, MAC-10's cut for a full half-hour, or even longer, without stopping for gas or oil. And they run and cut in any position. They run smooth, too, because of a vibration damping design. Feature for feature, you'll find that the new MAC-10 Series is truly the lightweight you've been waiting for. Let your McCulloch Dealer show you the MAC-10's now. Or write for your full color McCulloch chain saw catalog: McCulloch Corp., Dept. PS, 6101 West Century Blvd., Los Angeles, California 90045.

*Engine weight only, dry, less bar and chain.

Prices and specifications subject to change without notice or obligation.

**McCULLOCH**
**CHAIN SAWS • OUTBOARDS**
LEADERSHIP THROUGH CREATIVE ENGINEERING



Urheberrechtlich geschütztes Material

# ASSEMBLE YOUR OWN ALL-TRANSISTOR *Schober* ELECTRONIC ORGAN

3 NEW MODELS

| | |
|---|---|
| Recital | $1500 |
| Consolette II | $850 |
| Spinet | $550 |

**This is the new, all-transistor Schober Consolette II... the most luxurious "home-size" organ available today. Full 61-note manuals, 17 pedals, 22 stops and coupler, 3 pitch registers, and authentic theatre voicing leave little to be desired. Comparable to ready-built organs selling from $1800 to $2500.**

The pride and satisfaction of building one of these most pipe-like of electronic organs can now be yours... starting for as low as $550. The Schober Spinet, only 38 inches wide, fits into the smallest living room. The all-new, all-transistor Schober Recital Model actually sounds like a fine pipe organ; its 32 voices, 6 couplers, 5 pitch registers delight professional musicians... making learning easy for beginners.

**AND YOU SAVE 50% OR MORE BECAUSE YOU'RE BUYING DIRECTLY FROM THE MANUFACTURER AND PAYING ONLY FOR THE PARTS, NOT COSTLY LABOR.**

**It's easy to assemble a Schober Organ.** No special skills or experience needed. No technical or musical knowledge either. Everything you need is furnished, including the know-how. You supply only simple hand tools and the time.

**You can buy the organ section by section**... so you needn't spend the whole amount at once.
You can begin playing in an hour, even if you've never played before—with the ingenious Pointer System, available from Schober.

**Thousands of men and women**—teen-agers, too—have already assembled Schober Organs. We're proud to say that many who could afford to buy *any* organ have chosen Schober because they preferred it musically.

**Send for our free 1965 Schober Catalog,** describing in detail the exciting Schober Organs and optional accessories; it includes a free 7-inch "sampler" record so you can hear before you buy.

**THE *Schober Organ* CORPORATION**

**43 West 61st Street, New York, N. Y. 10023**

Also available in Canada, Australia, Hong Kong, Mexico, Puerto Rico, and the United Kingdom

**THE SCHOBER ORGAN CORP., DEPT.** PS-22
43 West 61st Street, New York, N. Y. 10023

☐ Please send me FREE 1965 Schober Catalog and FREE 7-inch "sampler" record.

☐ Enclosed find $2.00 for 10-inch quality LP record of Schober Organ music. ($2.00 refunded with purchase of first kit.)

Name_____

Address_____

City_____ State_____ Zip No._____

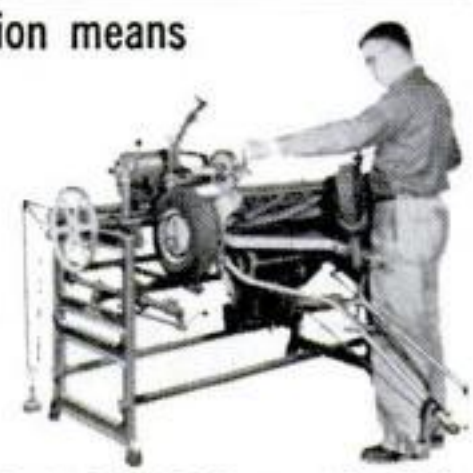
## *NOW*-You Can Fix Cars Faster

***With MOTOR's 2-in-1 Auto Repair Manual!***

FIX just about any part of 2,341 models. 1958 through 1965. NEW edition. Trouble-shooter spots what's wrong—Manual pages show exactly how to fix it! 1,325 big pages. 3,800 pictures. MUCH MORE! FREE 10-DAY TRIAL. Then, pay $2 in 10 days, $3 a month for 2 months, then $1.95 (plus delivery charge and sales tax), or return book. Send no money now! MOTOR BOOK Dept., Desk 520, 250 West 55th St., New York, N.Y. 10019

## IDEAL 900 LAWNMOWER SHARPENER

"Two-Way" Grinding Option means bigger profits for you!



The Ideal sharpens *any* reel-type mower by either "Hook" or "Straight-Line" methods. No limitations, every job perfect with no hand filing. Ruggedly built, screw adjustments can't slip, ½ hp. motor.

**Write for Full Details**

**The Fate-Root-Heath Co., Dept. PS-10, Plymouth, Ohio**

# DYNAKIT high fidelity

SCA-35
stereo amplifier—$99.95

For the cost-conscious perfectionist

- AMPLIFIERS
- TUNERS
- PREAMPLIFIERS

Write for detailed specifications and impartial test reports

**DYNACO INC., 3912 Powelton Ave., Phila. 4, Pa.**
Please send specifications and test reports to:

Name .....
Address .....
City ..... State..... PS 1065



Urheberrechtlich geschütztes Material

# Move Up Faster — Make More Money With N.T.S. "PROJECT METHOD" HOME TRAINING

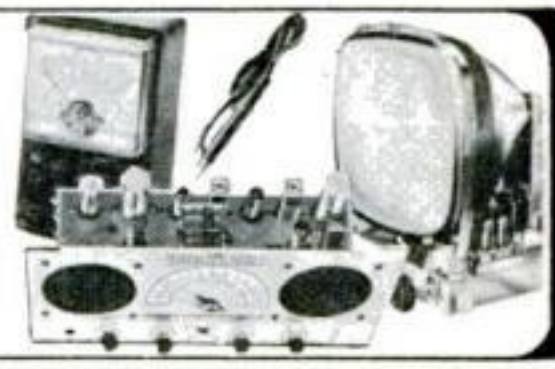
Looking for your first real job in industry? Are you stalemated in a dead-end job? Or, are you being left behind because you're not up on new industry methods? Don't let technical progress — automation — pass you up. There's an N.T.S. Project Method training program to help you MOVE UP FASTER and MAKE MORE MONEY!

N.T.S., a leading technical school for more than 60 years, **shop-tests every lesson and manual.** Easy-to-follow lessons are fully illustrated so you can learn **fast.** Look over the big opportunity home study courses below. Choose your field! Check the coupon and mail it today! You'll soon be on your way to a high-paying new career!

## ELECTRONICS DIVISION

1. Electronics-TV-Radio Servicing and Communications
2. Master Course in Electronics-TV-Radio Advanced TV and Industrial Electronics
3. FCC License Course
4. Radio Servicing (AM-FM-Transistors)
5. Television Servicing (Including Color)
6. Stereo, Hi-Fi and Sound Systems
7. Basic Electronics
8. Electronics Math

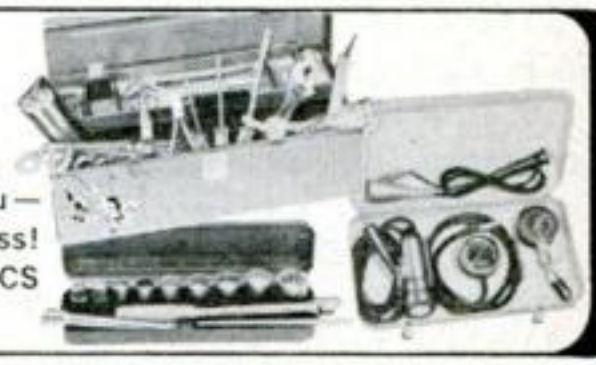
Train yourself quickly for America's "big future" industry! BIG EQUIPMENT KITS come with many of the electronics courses — at NO EXTRA COST! NO KIT DEPOSITS REQUIRED — equipment is included with your tuition.



## AUTO-MECHANICS DIVISION

1. Automotive-Diesel Master Course
2. Automotive Mechanics
3. Diesel Mechanics
4. Engine Tune-up and Electricity

Eighty million cars and trucks need maintenance! Here's opportunity for you — in manufacturing, in sales and service — in your own auto repair business! VALUABLE TOOLS AND EQUIPMENT COME WITH ALL N.T.S. AUTO-MECHANICS COURSES! NO KIT DEPOSITS REQUIRED — NO EXTRA COST!



## AIR CONDITIONING — REFRIGERATION DIVISION

1. Air Conditioning-Refrigeration Servicing Course
2. Air Conditioning, Refrigeration & Electrical Appliances Master Course

Good income in installation & servicing homes, factories, schools, hotels & motels, office buildings, stores, cars, trains, buses and in servicing electrical appliances. The trained man in these fields is in demand! BOTH COURSES COME WITH BIG EQUIPMENT KITS AT NO EXTRA CHARGE. NO KIT DEPOSITS REQUIRED.

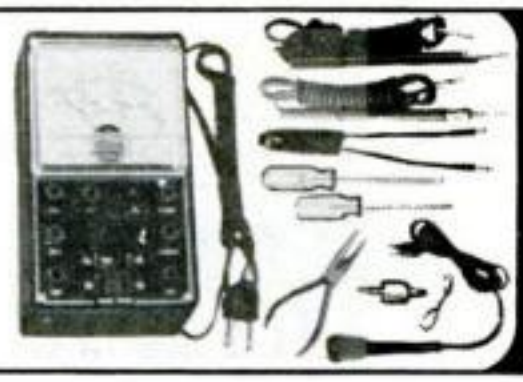
## HIGH SCHOOL AT HOME

**National offers accredited high school programs. Take only subjects you need. Study at your own pace. Everything included at one low tuition. Check special High School box in coupon for full information and FREE catalog.**

## HOME APPLIANCES DIVISION

1. **Home Appliances Master Technician's Course.** Prepares you quickly for a business of your own in all phases of major and small appliance work.
2. **Home Appliances Servicing Course.** Prepares you for a part or full time job. Earn while you learn.

**No kit deposits required. No extra cost.**



## Classroom Training at Los Angeles.

You can take classroom training at Los Angeles in Sunny Southern California. N. T. S. is the oldest and largest school of its kind. Check Resident School box in coupon for details.

## SEND FOR FREE BOOK & SAMPLE LESSON

CHECK ONE ONLY

**Accredited Member National Home Study Council**

## NATIONAL TECHNICAL SCHOOLS

WORLD-WIDE TRAINING SINCE 1905

4000 S. Figueroa Street, Los Angeles, Calif. 90037

YOU ENROLL BY MAIL UNDER N.T.S. "NO OBLIGATION PLAN." WE HAVE NO SALESMEN; THIS MEANS LOWER TUITION FOR YOU.

## NATIONAL TECHNICAL SCHOOLS

WORLD-WIDE TRAINING SINCE 1905

**NATIONAL TECHNICAL SCHOOLS, DEPT. 202-105**
4000 S. Figueroa St., Los Angeles, Calif. 90037

Please rush FREE BOOK AND SAMPLE LESSON on Courses in the Division checked below. No obligation — No salesman will call.

- ☐ ELECTRONICS Division
- ☐ AUTO-MECHANICS Division
- ☐ AIR CONDITIONING-REFRIGERATION Division
- ☐ HOME APPLIANCES Division
- ☐ HIGH SCHOOL Department

Name_____ Age____

Address _____

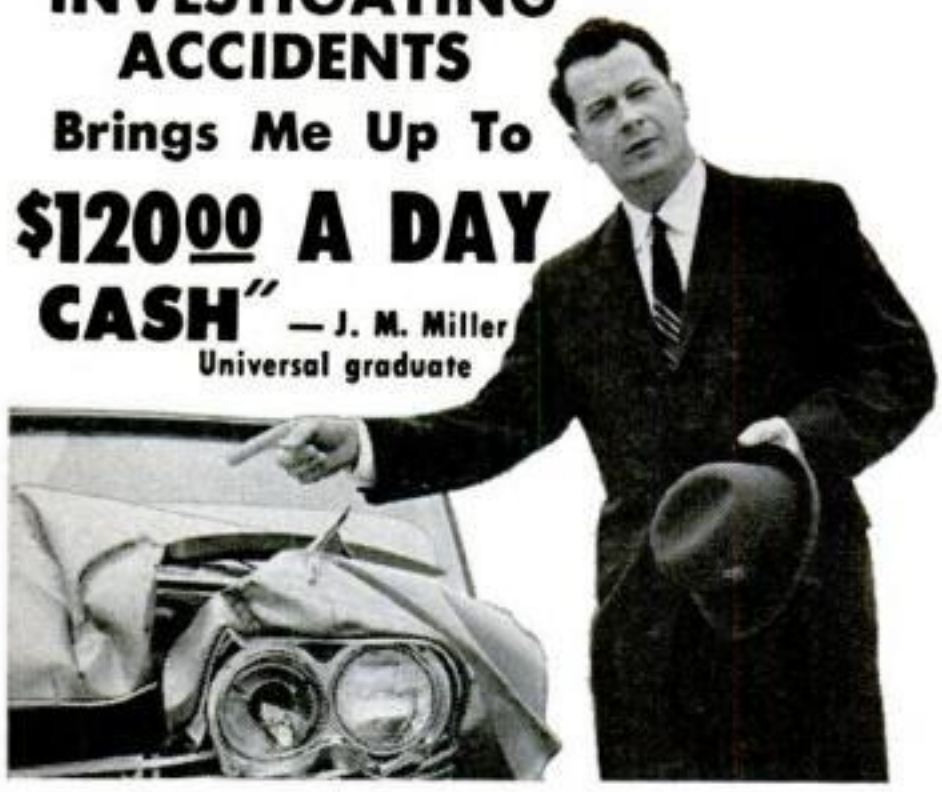
City_____ State_____ Zip_____

☐ Check here if interested ONLY in classroom training at Los Angeles.



Urheberrechtlich geschütztes Material

# "INVESTIGATING ACCIDENTS Brings Me Up To $120.00 A DAY CASH" — J. M. Miller
Universal graduate



## Step Into This Booming $19 Billion A Year Industry

You can earn up to $15 an hour . . . repeat, year-round income . . . in the exciting, fast-growing Accident Investigation field. Car furnished. Business expenses paid. NO selling. NO higher education necessary. NO equipment needed. And age is NO barrier. **You can earn while you learn.** Keep present job until ready to switch. Rush coupon for all facts and material.

FREE BOOK

**UNIVERSAL SCHOOLS** PS-10
6801 Hillcrest, Dallas 5, Texas

Send FREE Book on Big Money In The Amazing Accident Investigation Field. No obligation.

Name_____
Address_____
City_____ Zone____ State_____

---

# MONEY BY MAIL

**FAST, CONFIDENTIAL SERVICE UNDER GOVERNMENT REGULATION**

If you're between 25 and 65, steadily employed, you can borrow up to $800 on your signature alone. We notify no one. We are Government regulated, operating under the Missouri State Division of Finance, Department of Business Administration. Fill in the coupon below; we'll send application papers by return mail.

| CASH YOU RECEIVE | 36 MONTHLY PAYMENTS* |
|---|---|
| $400 | $17.81 |
| $500 | 22.21 |
| $600 | 26.14 |
| $700 | 29.88 |
| $800 | 33.50 |

*The above payments include Creditor Life Insurance

**MURDOCK ACCEPTANCE CORPORATION** DEPT. 339
**P.O. BOX 659 / POPLAR BLUFF, MISSOURI**

Name _____
Address _____
City_____ State_____

RENDERING FAITHFUL SERVICE FOR A QUARTER CENTURY

---

*You can make money in*

# WATCH REPAIR

## Learn at home the low cost Sweazey Way

Watch repairing pays up to $6 an hour, part time watch makers report on survey. Unique and modern Sweazey home study System starts you making repairs right away on Swiss and American watches. Professionally prepared training. No previous experience needed. Special tools provided for practice. Tuition only $5 a month. Diploma Awarded. Free sample lesson and opportunity book give all facts. Write today. No obligation.

**CHICAGO SCHOOL OF WATCHMAKING**
**Dept. 4105** **Fox River Grove, Illinois 60021**

---

## START RIGHT NOW TO MAKE $100 A WEEK OR MORE

How would you like to have someone say to you: "We'll set you up in your own business, give you a protected selling territory and prove to you that you can make a starting income of $100 a week by making just 6 sales a day?" Does it sound unbelievable? No! Harper brushes are sold nationally by reputable businessmen who have made it their lifetime work. You can join their ranks, just by writing Harper today. Repeat orders, top-quality products and guaranteed sales plan all combine to put you in business, keep you there. **Write Harper Brush Works, 1065 Second Ave., Fairfield, Iowa. WE'LL MAKE IT WORTH YOUR WHILE.**

---

# MOST POWERFUL PORTABLE HEATER FOR ITS SIZE

**Now with exclusive safety control.** Designed for unattended operation. In cottage, garage, workshop or on the job. Circulates full heat *instantly*. 50,000 BTUs! Runs over 10 hours on 1 tankful of low-cost kerosene. Weighs only 42 lbs. $114.95. Standard model $99.95. F.O.B. Factory. (Prices slightly higher West Coast.)

**REDDY HEATER Co., 333 W. First St., Dayton, Ohio 45402**

*Please send free REDDY HEATER folder. (A)*

*NAME*_____

*ADDRESS*_____

*CITY*_____ *STATE*_____

REDDY HEATER

Urheberrechtlich geschütztes Material

*Is common "Language Deficiency" robbing you of your one big chance in life?*

# Now—increase your chance for financial and social success—with this new self-study "college-at-home" program...

*Created by Professor Harry Shefter, Associate Professor of English at New York University and prominent author of books in the field of English improvement.*

Today *thousands* of Americans are denied their "big chance," simply *because they do not know how to use the English language effectively!* For, top executives point out, the ability to *write, speak* and *read* effectively is the "secret ingredient" in rapid advancement.

If "language deficiency" is holding *you* back, here is your big chance! An entirely *new* "audio-visual" course in English, with guidance by a noted teacher, has been created especially for *you*—THE HOME UNIVERSITY COURSE IN ENGLISH—yours to "try" for ten days without obligation!

### An Amazing New Self-Teaching Program

After 20 years of *experience* and *testing* in the *most effective* methods of helping people improve their skills, Professor Shefter has created this *complete program* to teach you how to use the English language *for building success!* The Course consists of *five* wonderful self-teaching books; a Study Guide; the Shefter Spell-Builder and Span-Stretchers (two *new* learning tools); *and* three Spelling Records!

### Special 10-Day, No Obligation Trial Offer!

Whatever your occupation—you can benefit from this "college-at-home" course that will (1) improve your *spelling;* (2) help you *speak* and *write* effectively; (3) develop your *reading* and *vocabulary* skills; (4) *double* your reading *speed!*

Although you would pay several *hundred* dollars for equivalent *university* courses, the *complete* cost to you for the *entire* Course is only $15.95! And bear in mind: this new HOME UNIVERSITY COURSE IN ENGLISH is the *only* one which will provide *all the instruction you need for complete mastery of your language skills.*

We will actually send you the entire course to use *right in your own home*—for 10 days free!

### Mail Special Coupon—Today!

Simply fill out the coupon at right, clip, and return to us with your first installment of only $5.95. We'll ship you the complete Course and cover all shipping costs. If not fully satisfied, return it in 10 days for full refund. If you *keep* these tested learning aids, we'll *then* bill you in two more easy installments of $5.00 each. And we will send you *two additional* reference books—*free!* Mail the attached coupon, *today!*

## EXTRA! 2 FREE BONUS BOOKS!

You will receive two *free* reference books (same size and binding as your five basic books)—to be shipped when your last two monthly installments are received.

**The New Merriam-Webster Pocket Dictionary**—a valuable 640-page dictionary, specially prepared for general use by the world's leading dictionary makers!

**The New Pocket Roget's Thesaurus**—arranged in easy-to-use dictionary form to help you find the exact word or phrase you need quickly!

**FIVE AMAZING LANGUAGE-IMPROVEMENT BOOKS** — (handy 6½" x 4¼" size, bound in Leather-Tex)

**Shortcuts to Effective English:** A "grammarless grammar" that helps you learn how to use **what you know** to improve your language mechanics!

**6 Minutes a Day to Perfect Spelling:** The famous Shefter **See-Think-Feel-Say-Build-the-Word** system that has already shown over 1,500,000 people how to become perfect spellers!

**How to Prepare Talks and Oral Reports:** Remarkable "DE-SCEND" technique that trains you to speak with confidence, fascinate your listeners, put across any appeal. Plus the special, removable SpeeCHart for easy self-analysis!

**Shefter's Guide to Better Compositions:** Writing program that clearly reveals the **how's** of improving the 7 basic "trouble" areas of written expression. Plus the special, removable **Comp-Check** for easy self-analysis!

**Faster Reading Self-Taught!** The new, tested 5-Step Plan that shows you how to read 100 per cent faster, yet understand and retain much **more** of what you read!

**THE NEW SHEFTER "SPELL-BUILDER"**
Complete with hardwood rack and letter sets, this wonderful new spelling tool will make your spelling letter-perfect!

**THE NEW SHEFTER "SPAN-STRETCHERS"**
Unique self-teaching aid specially designed to train you in **reading** — up to 1200 words per minute!

**LANGUAGE LABORATORY RECORDS**
Three 33⅓ r.p.m. long-playing records help you test yourself — a novel method of audio-visual instruction!

**STUDY GUIDE**
Specially-prepared "handbook" coordinates **all** the materials in the course and outlines your daily and long-range study programs.

**Mail Introductory Certificate to**
**HOME UNIVERSITY COURSE IN ENGLISH**
**Dept. HF, 630 5th Avenue, New York 10020**

Please send me the complete HOME UNIVERSITY COURSE IN ENGLISH (including five basic books, plus study guide; the Shefter Spell-Builder and Shefter Span-Stretchers; and three long-playing Spelling Records.) I enclose $5.95 as my first installment. If I am not satisfied with the Course, I may return it within 10 days and you will promptly refund my payment. If I **keep** the Course, you will bill me $5.00 in two additional monthly installments, makng the total price $15.95. For each of the last two payments, you will send me a **free** reference book.

Name_____

Address_____

City_____ State_____ Zip Code_____



Urheberrechtlich geschütztes Material

# FREE!

## Trial lesson in DRAFTING & DESIGN

**LEARN AT HOME IN SPARE TIME**

Check the want ads in any newspaper — SEE the big-pay opportunities open to you as a draftsman. What's more, you can learn this well-paid, prestige profession at home — quickly, easily! No special talent needed! Get complete, step-by-step Chicago Tech lessons in the mail, spend a few pleasant hours studying each week. In a short time you'll be a well-trained draftsman, ready to take your pick of many good jobs. Act now!

**FREE INFORMATION—MAIL COUPON TODAY!**

Get FREE TRIAL LESSON plus information about C.T.C. practical training. Learn what successful Chicago Tech graduates say about high pay and opportunities in drafting. No charge, or obligation.

Est. 1904 Accredited National Home Study Council

**CHICAGO TECHNICAL COLLEGE**

**N-233 Tech Bldg., 2000 So. Michigan Ave. Chicago 16, Illinois**

Mail me FREE Lesson with information about big opportunities in DRAFTING.

Name..... Age.....

Address .....

City..... Zone..... State.....

FOR QUALITY LUBRICATION CHANGE TO

# KENDALL MOTOR OILS

KENDALL REFINING COMPANY
BRADFORD, PENNA. and TORONTO, CAN.

# FREE Key Machine

Kind master locksmiths use. Sells for $125, but yours FREE with Belsaw Locksmithing Course.

**You Can Learn To Be A LOCKSMITH in your spare time**

There's a big demand for skilled locksmiths. You can earn big money either full or part-time in your own home. BELSAW INSTITUTE training, recommended by professional locksmiths, teaches you to make keys, open and repair locks on homes, cars and buildings. Easy, illustrated lessons complete with tools and supplies. Tells you how to build a secure cash profit business. **Send for Free Book—No agent will call.**

BELSAW INSTITUTE, 116D Field Bldg., Kansas City 11, Mo.

## "Must" Reading for Every Hunter

# 16-Page Bonus Guide to Best Deer Hunting in U.S.

Get full details on 1965's top hotspots for whitetails and mule deer in every section of the country. Prepared by leading hunting experts.

In the October issue of

# Outdoor Life

America's Favorite Outdoor Magazine

**on sale now at all newsdealers**

**only 35c**

**pick up your copy today**




Urheberrechtlich geschütztes Material

# NEW FROM INTERNATIONAL

## MODEL 660 CITIZENS RADIO TRANSCEIVER

**The International Model 660** . . . new in styling . . . new in advanced technical features, combines space-age colors and decor with greater operating convenience.

Designed for base and mobile installations, the Model 660 provides instant push-to-talk operation on all 23 channels. Silicon transistors and tubes are combined in a new hybrid circuit for the highest degree of reliability.

A transistor power supply operates from 6/12 or 115 vac.

See the International Model 660 at your dealer today. It comes complete with crystals and dynamic microphone.

INTERNATIONAL CRYSTAL MFG. CO., INC.
18 NORTH LEE — OKLA. CITY, OKLA.

FCC Citizens Radio license required. All use must conform with Part 95, FCC Rules and Regulations.

## BENSEN GYROCOPTER — MOST FUN, LEAST COST . . . AND YOU CAN BUILD IT YOURSELF!

Enjoy the thrill of flying—in your own Copter! Thousands built by others like you. Simple and safe to fly, economical to operate. Lifts up to 500 pounds, fits into a garage. Designed by aeronautical engineers for building with hobbyshop tools. Kits available, also construction plans and flying instructions. Learn more about it now—get 3-View Drawings, specs, photo for $3, or of simpler Gyroglider for $2.

SEND $2 or $3

BENSEN AIRCRAFT CORP. Dept. PS-105
Raleigh-Durham Airport, Raleigh, N. C. 27602

NAME_____

ADDRESS_____

# 5 things you should do about the draft

**1** Don't panic. Make no decisions until you've investigated all the alternatives. Keep an open mind.

**2** Write down what you want from life. The kind of job you want, the training you'll need. And where you can get it.

**3** Talk to people. Your school guidance counselor. A teacher. Your coach. A friend. Your parents. Find out what they would do.

**4** Investigate. Find out what benefits you can get if you enlist. See your Army Recruiting Sergeant. He knows all about the draft and your military obligation. He'll be glad to answer your questions. While you're there, ask him about the more than 300 jobs you can train for if you enlist. Jobs you can choose before enlisting.

**5** Send for the free, 40-page booklet, The Secret of Getting Ahead. Fill out the coupon below, and send it in today. There's no obligation, and it could be the most important booklet you've ever read.

11A-10

**Army**
OPPORTUNITIES
Box 1040
Westbury, N.Y. 11591

Please rush me your 40-page booklet, "The Secret of Getting Ahead."

NAME_____ AGE_____

ADDRESS_____

CITY_____ STATE_____ ZIP CODE_____

PHONE_____ EDUCATION_____



Urheberrechtlich geschütztes Material

# No Ordinary Oil Filter Can Protect a Car's Engine for the 6,000 Mile Oil Change Interval Specified by Car Factories . . . WIX Multi-Cel Filters Can and . . . . . Do!

Whether you drive a car, truck or tractor go to the dealer who gives you your money's worth . . . the man who sells WIX Oil, Air and Fuel Filters. Get the extra bonus miles of filtering performance . . . you'll notice the difference with WIX, in improved mileage and reduced engine wear.

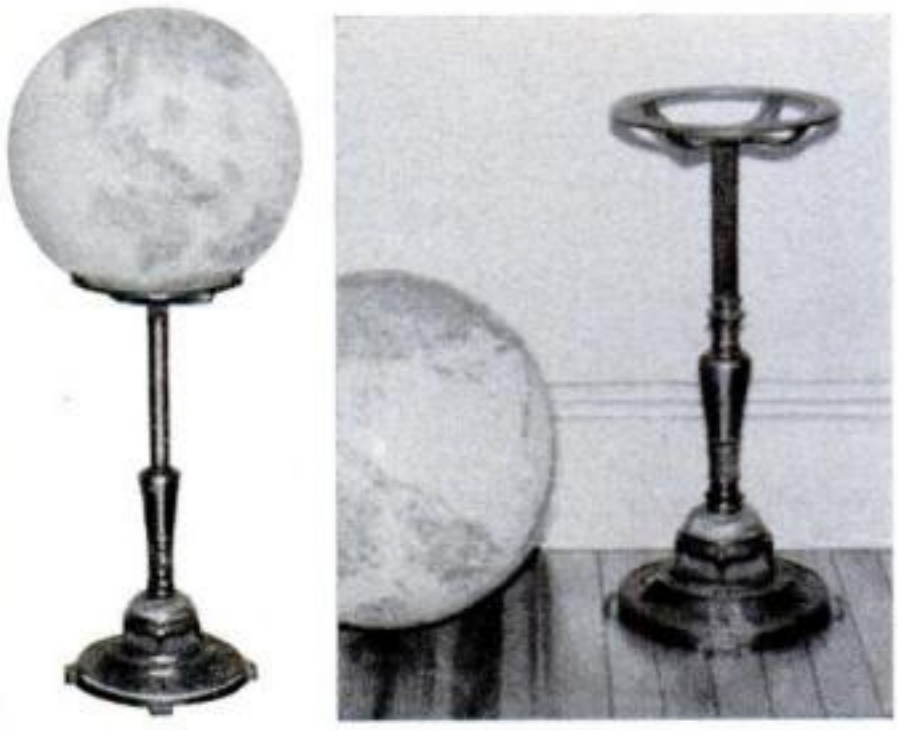
WIX® FILTERS

**WIX CORPORATION • GASTONIA, N. C.**

**THE GOLD STANDARD IN FILTRATION**

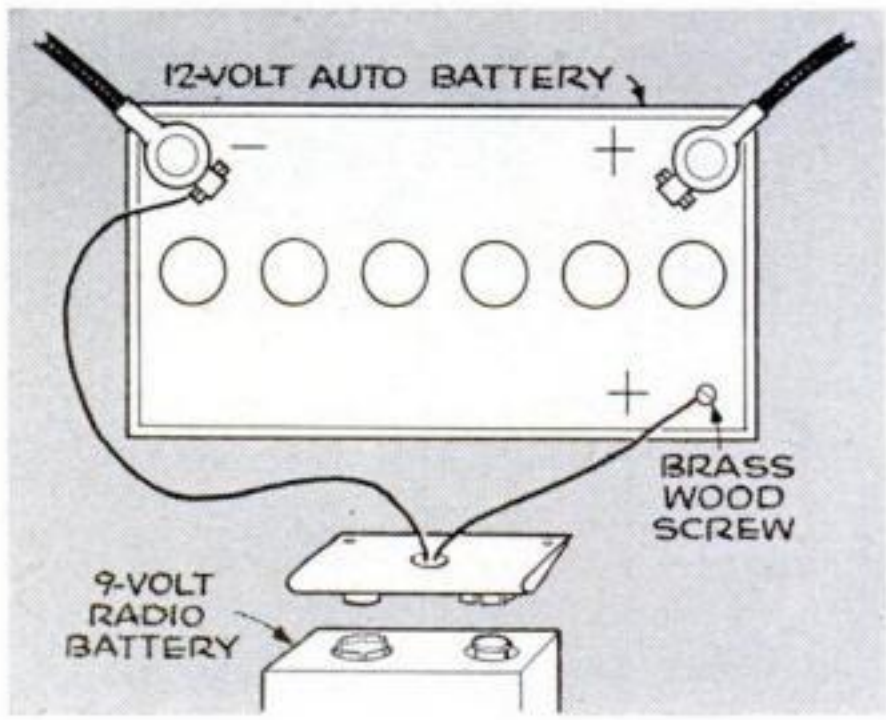



## Short Cuts and Tips FROM PS READERS



### Floor stand for table-model globe

A globe with its own floor stand is decorative but expensive. You can make your own by mounting a 12″ or 16″ table model on a smoking stand picked up at a used-furniture store for a dollar or so. Remove the tray and glue a felt strip around the opening. The globe, set in the opening, moves freely in all directions.—*H. R. Rosenblatt, Newton Centre, Mass.*




### How to get 9 volts from 12

A 10-volt tap on a 12-volt car battery is ideal for charging 9-volt radio batteries. The sketch above shows how I did it, sinking a brass wood screw into the end of the first cell opposite the ground post. Proper polarity must be found on the first connection. After that you just clip on the battery you want charged for 30 to 60 minutes. I have not noticed any bad effects on my car battery from using it this way.—*A. R. Coale, Silver Spring, Md.*

Urheberrechtlich geschütztes Material

# You get more for your money from NRI-
# oldest and largest home-study school of its kind

Compare. You'll find, as have many thousands of others, that NRI "3 Dimensional" training can't be equalled. From the delivery of your first lessons in the remarkable new Achievement Kit we send you, to "bite-size" easily read texts and carefully designed training equipment . . . NRI gives you more value. Everything you see below is included in just **one** low cost NRI course. Other major courses are as complete. Text for text, kit for kit, dollar for dollar — your best home-study buy is NRI.

## GET A FAST START WITH NRI'S ABSORBING, NEW ACHIEVEMENT KIT

When you enroll with NRI we deliver to your door everything you need to make a fast start in the Electronics field of your choice. This remarkable new starter kit is an outstanding, logical way to introduce you to NRI training kits; an unparalleled example of the value of NRI home-study training. What's in it? Your first group of lesson texts; a rich, vinyl desk folder; NRI's valuable Radio-TV Electronics Dictionary; important reference texts; lesson answer sheets; envelopes; pencils; pen; ruler and even postage. No other school has anything like it. Start your training this absorbing, exciting way.

## ELECTRONICS COMES ALIVE WITH CUSTOM TRAINING KITS

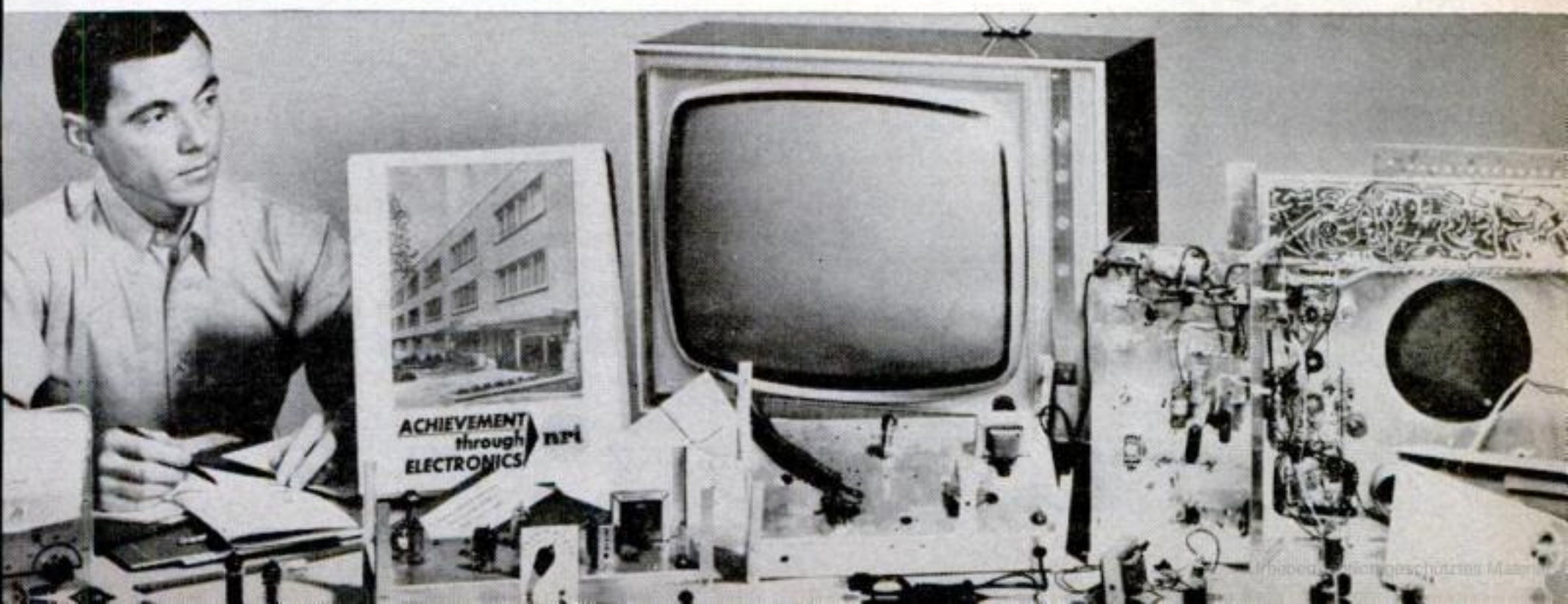
Get your hands on actual parts and build, experiment, explore, discover. NRI pioneered and perfected the "home lab" technique of learning at home in spare time. Nothing is as effective as learning by doing. That's why NRI puts emphasis on equipment, why it invites comparison with equipment offered by any other school. Begin now this exciting program of practical learning. It's the most rewarding way to prepare for a career in Electronics. It's the best way to understand fully the skills of the finest technicians — and make their techniques your own. It's the priceless "third dimension" in NRI's training method.

## "BITE SIZE" LESSON TEXTS PROGRAM YOUR TRAINING AT HOME

Certainly, lesson texts are necessary. NRI's programmed texts are as simple, direct and well-illustrated as 50 years of teaching experience can make them. They are carefully programmed with NRI training kits to make the things you read about come alive. You'll experience all the excitement of original discovery. Whatever your need, whatever your education, there's an NRI instruction plan for you, at low tuition rates. Get the facts in the new NRI Catalog. Fill in and mail the postage-free card today. No salesman will call. NATIONAL RADIO INSTITUTE, Electronics Division, Washington, D. C. 20016.

# Learning Electronics, Television-Radio is fast, easy, interesting with NRI

From Achievement Kit to custom TV kit, everything shown below is yours when you enroll for NRI's Radio-TV Servicing Course. Other NRI courses are just as complete. But NRI training is more than kits and texts. It is many personal services, too. Mail postage-free card.



# Enjoy Profits from Your Own Business While Still Employed

Without quitting your job or losing one pay check, you can enjoy **growing profits** from **your OWN** nationally advertised business. Free 24 page book tells how men do it... how they grow to a full time, high profit business... how we guide men to success.

Hourly gross profit is $9 **plus** $6 on each serviceman.

Exclusive **absorption** process cleans **and revives** upholstery, rugs, carpets. Also 5 other on-location services. Your world-wide service is endorsed by McCall's, Parents' Magazine, carpet mills and furniture manufacturers.

You need no experience. We show you how. We finance you for all but a few hundred dollars. Easy to learn . . . easy to do . . . easy to build a steady income. We show you 15 tested ways to get customers.

L. Babbit writes, "I average $2,600 monthly, part time." W. C. Smith earned $650 in one week. Ed Kramsky said, "in two years I have two assistants, a home and security." G. F. Monroe, after 12 months, sold his business for 10 times his cost. Leo Lubel sold his for $7,116 more than he paid.

This may be the opportunity of your life. **Find out today** before some one else gets your location. Mail coupon now for details and 24-page illustrated free book. No obligation. No salesman will call. Mail coupon now while territories are open.

**DURACLEAN COMPANY**

**5-180 Duraclean Building, Deerfield, Illinois 60015**

Send 24-page booklet telling how I can quickly enlarge my income in spare time while I build my own full time prosperous business. No obligation.

NAME_____

ADDRESS_____

CITY_____ STATE_____ ZIP CODE_____

# FREE PLAN *How to Start* Your Own Business

Start a steady repeat CASH business in your basement or garage. Earn $3 to $6 an hour in your sparetime! Excellent profits in saw sharpening business! Automatic Foley Saw Filer, easy to operate, files combination saws, hand, band, and circular saws. No experience needed. H. C. Deibert wrote us: "Since I got my Foley Filer 5 years ago, I have averaged 4½ saws each day since I started."

Every saw you sharpen brings you more customers. "I rented a two-car garage and have all the work I can do," writes Charles H. Smith.

## FREE BOOK
### *Shows How to Start*

Fact filled booklet tells you how to start a sparetime business immediately; how to get new business, how to advertise. Rush coupon now; get "Money Making Facts" and details on Easy Payment Plan. No Salesman will call.

*Send Coupon for FREE BOOK Money Making Facts*

FOLEY MANUFACTURING CO.
1019-5 Foley Bldg. Minneapolis 18, Minn.

Send FREE BOOK—"Money Making Facts", and Time Payment Plan.

Name_____

Address_____

# *Let's Do LEATHERCRAFT!*

**HERE'S A GENUINE LEATHER BILLFOLD KIT AS A STARTER**

ONLY **25¢**

Choice of men's style, with 5 pockets or ladies' with 4 pockets and coin purse. Kit complete. Ready to assemble. Design embossed. So easy a child can do.

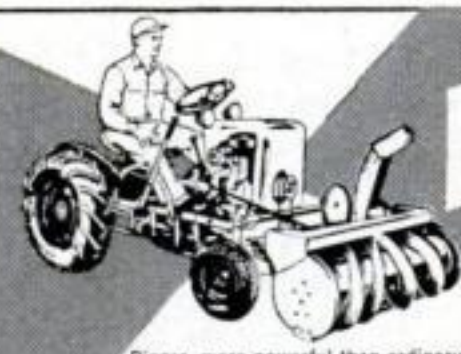
WORTH $3.50 COMPLETED

WRITE TODAY (only one per family)

Send 25¢, name, address and choice of styles to:

**TANDY LEATHER COMPANY**

1001 Foch St., Dept. PD Fort Worth, Texas 76107



*Man-size* **ECONOMY** ALL-GEAR-DRIVE **TRACTOR** *at garden-size price*

Snow Blow, 3 ft. or 4 ft. Casts snow 20 ft.

Bigger, more powerful than ordinary garden tractors. For farm, lawn, woodland. Easy to operate. Rugged, built-in quality. 9-12 hp. ALL GEAR DRIVE incl. clutch, 3-spd. trans., diff., 176 to 1 reduc. No belts in drive-train. Wt. 750 lbs. 25 low-cost quick-change tools. Write for FREE CATALOG and dealer name.

ENGINEERING PRODUCTS CO., 1005 A-10 Anoka Ave., Waukesha, Wis. 53-5-3

**TURN YOUR IDEAS INTO CASH!**

## EARN A SMALL FORTUNE
### for Ideas, Inventions, Gadgets and Gimmicks

Big corporations all over the U.S. pay thousands of dollars each day for ideas and inventions. Get your share! Invent, create, develop, or adapt a new idea or product and you can make more money than you ever dreamed of. Learn how and where in this NEW Directory of Companies seeking and paying top dollars! Send $1 Today for the Directory that may change your whole life!

**Ideas Pub. Co., 60 East 42, Suite 411-C, New York 10017**

when it's time to think of college you should read this

**FREE CAREER BOOKLET**

about engineering at

# MSOE

**MILWAUKEE SCHOOL OF ENGINEERING** MS-236

Dept. PSM-1065, 1025 N. Milwaukee Street
Milwaukee, Wisconsin 53201

Tell me about an engineering career through residence study in:

☐ Electrical fields ☐ Mechanical fields

Name_____ Age_____

Address_____

City, State_____



Urheberrechtlich geschütztes Material

# Here You Can Find a Solution to Practically ANY MECHANICAL PROBLEM!

**PARTIAL CONTENTS:**

Accumulators
Air Conditioners
Alarms
Amplifiers
Anchors
Anti-Friction
Baffles
Ball Joints
Bearings
Bed Plates
Blowers
Brakes
Burners
Cams
Chains
Chain Gears
Cheeks
Chucks
Circular Motions
Clamps
Cleaners
Clutches
Compressed Air Power
Connecting Rods
Conveyors
Cooling
Cotters
Counters
Covers
Cranes
Cranks
Crushing
Cutting
Derricks
Diesel Power
Drilling
Electric Power
Electron Tubes
Elevators
Engines
Expanders
Fasteners
Feeders
Filters
Gauges
Gears
Generator
Governors
Grinders
Grips
Guides
Heating
Humidifiers
Hydraulic Power
Indicators
Infra-Red
Keys
Levers
Loaders
Links
Locks
Lubricators
Magnetism
Measuring
  speed
  heat
  pressure
Mixing
Motors
Nozzles
Parallel Motions
Pawls
Pipes
Pivots
Propulsions
Pumps
Raisings
Ratchets
Refrigeration
Reciprocating Motion
Regulators
Rocket Propulsion
Safety Devices
Sanitation Devices
Seals
Sea Wave Power
Separators
Shafting
Shifting Gears
Shields
Shock Absorber
Sifting
Signals
Slides
Slings
Sounds
Springs
Startings
Steam Power
Stokers
Swivels
Striking
Sound Receivers
Tappets
Thermostats
Traps
Valves
Vaporizers
Washing
Winding
etc.

A copy belongs in every reference library, school—every shop, plant, factory—with every machinist, engineer, student, inventor

## A BOOK with OVER 8000 ILLUSTRATIONS WITH DESCRIPTIONS of Mechanical Movements, Devices, Contrivances and Details

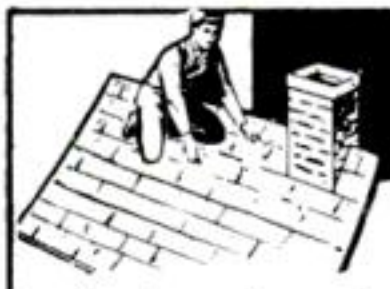
**No. 501.** If you work with machinery of any kind, you may be called upon to devise or improve some job or motion. To do this, you either have to rely on memory, experience or ingenuity. Here in this new book—THE ENGINEERS' THESAURUS by Herbert Herkimer—you will find over 8,000 IDEAS and SUGGESTIONS for accomplishing any kind of motion, force or work: It is a compilation of the contrivances, parts, details, tools, machines, devices and means—devised and developed by countless engineers, machinists and inventors over the years—to effect any motion or task.

The material has been painstakingly assembled and classified, from many sources— research books, engineering brochures, patent drawings, catalogs, etc. It is, by far, the **largest collection** ever gathered in one book—and the only one which shows, side by side, the many different means and methods for accomplishing any particular task!

Each item, each device, each method is illustrated—there are 8,000 such illustrations—and each one carries a pertinent description of its makeup and function. THE ENGINEERS' THESAURUS is a monumental work. It is 5½ x 8½ inches. 580 pages, printed on coated paper, cloth-bound.

Each one of these "ideas" is practical—just one may save you a lot of "headache"—save on your costs—add to your profits!

**Order by Mail.** Positive guarantee of money-back-if-not-satisfied. **Price only $5.95**



## HOME REPAIRS MADE EASY

**No. 3164.** Save hundreds of dollars in home repairs. Learn how simple and easy it is to repair your own roof, windows, doors, floors, walls, ceiling, painting, plumbing, heating, electrical work, furniture repairs and much more. This new book also describes various tools, their use and care. Send for it NOW and start saving $$$. A "MUST" for home-owners. **Only $2.00 postpaid.**

## Mechanical Drawing

***(Self Taught)***

**No. 3118.** This sensational new book can help you become an expert draftsman. Contains the latest up-to-date, authoritative instructions and methods. 21 step-by-step illustrated drawings teaches you how to scale drawings, hand letter, use of the French curve and the use of other mechanical drawing instruments. It's easy to achieve perfection in mechanical drawing. **Only $2.00 postpaid**

## A STEP-BY-STEP GUIDE TO DOING MAJOR CARPENTRY WORK

**No. 1512.** HOW TO BE YOUR OWN CARPENTER by the syndicated columnist Carlson Wade reduces every conceivable carpentry job into a few easy steps. — Framing either for rooms, floors, ceilings, roofs, or partitions is completely systematized; in simple steps you build the sills, then the girders, joists, trusses and other components, until the frame is finished before you know it. — The book shows you how to build and plumb straight any wall from its bottom plate through its studs and headers. It gives you the 6 steps needed to build window frames, the 13 steps to build door frames, the 5 steps to beautiful stairs, the 3 steps to dry wall installation, the 6 to ceiling construction. — The guide shows you how to construct roofing dormers and contains a special chapter on typical home repairs involving windows, flooring, walls, roofs, doors and other tricky jobs. **Only $2.95 postpaid.**

## How to REPAIR YOUR CAR

Save Money on Auto Repairs. Do it yourself.

**No. 3162.** You'll find everything covered, from Ammeter to Voltage Regulator plus chapters on emergency repairs, tools and equipment, a price list of various repairs, preventive maintenance measures, buying parts new and rebuilt. **Only $2.00 postpaid**

**No. 3161.** You must read the Driver's Manual to drive your car so get **THE MOTORBOAT OWNER'S HANDBOOK** and enjoy boating with your mind at ease. Written by Arthur Lieber of the Sunday Times. **Only $2.00 postpaid**

PADELL BOOK COMPANY — Dept. PS-10
6 Meadow Lane, Freeport, L. I., N. Y.

Please send me the books encircled below. If I am not satisfied I can get my money back. I enclose $..... in payment.

Name .....
Address .....
.....

501 1512
3164 3162
3118 3161

Urheberrechtlich geschütztes Material

# SECRETS of Teaching Yourself MUSIC

## *revealed in your own home this money-saving way*

YES! Teach yourself Piano, Guitar, Accordion, Sax, ANY instrument—even if you don't know a single note now! No special "talent," no previous training needed. Famous low-cost U.S. School of Music Course, with step-by-step pictured lessons, make it simple as A-B-C. Everything is in print and pictures. First you are told what to do. Then a picture shows you how. No boring exercises, no tedious scales. You start by playing actual **pieces.** Sooner than you may imagine you'll amaze friends by playing your favorite music—show, pops, classical, jazz, country music, dance tunes, etc. Over 1,250,000 students all over the world.

**Stop Cheating Yourself of These Joys**

Popularity. New friends. Gay parties. Musical career. Extra money. Banish worries, frustrations. Satisfy self-expression, creative urge. Gain self-confidence.

Write today for 36-page illustrated FREE book. **U.S. SCHOOL OF MUSIC, STUDIO** A1510, Port Washington, N. Y. 11050. (Est. 1898, Licensed by N. Y. State Education Dept.)

Name.....

Address.....

City & State..... Zip Code.....

# champing at the bit for a really cool pipe?

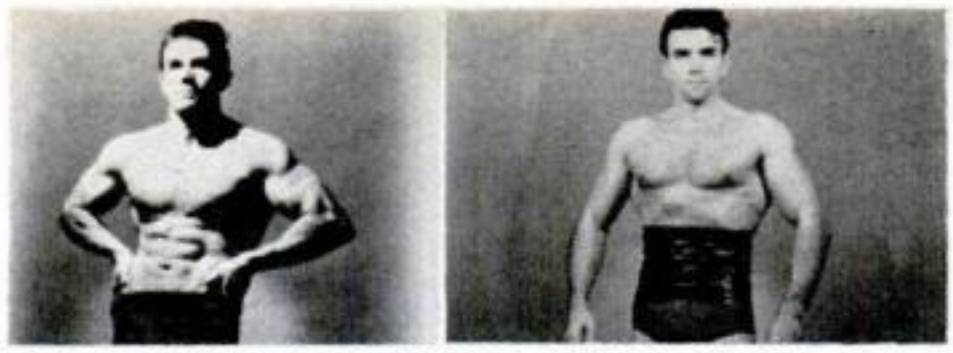
## *LIGHT UP A* Kirsten*

Kirsten's patented Duralumin Radiator stem not only produces a cooler draw, but condenses out harsh and harmful tobacco impurities. Moisture easily is removed with a flick of the exclusive Kirsten valve. Featherweight Sportsman model features premium imported Mediterranean briar and hand-finished vulcanite bit. Order yours by mail today. Just $7 Postpaid.

**SEND FOR YOUR FREE CATALOG**

20 pages of full-color illustrations of all the Kirsten models up to $18.50

**KIRSTEN PIPE CO., Inc.**
Dept. PS-10,
P.O. Box 5227
Seattle, Wash. 98107



**TRIM THAT WAISTLINE—NEW! NEW!** Great new heat belt! Fits snugly around waist to create heat with the slightest exertion. Ruggedly built to give with any type of movement without slipping down or up. Wear it to work or a workout! Send waist size. $2.95. **House of Health, Dept. P-1, 310 East 1st St., Dayton, Ohio 45402**

## B.S. DEGREE IN 36 MONTHS

Small professionally-oriented college. Four-quarter year permits completion of degree in *Engineering* or *Business Administration* in three years. One year Drafting and Design Certificate program. Founded 1884. Rich heritage. Excellent faculty. Small classes. Well-equipped labs. New library. Residence halls. 300-acre campus. Graduate placement outstanding. *Modest costs.* Enter Jan., March, June, Sept.

*For Catalog And View Book, write Director of Admissions*

**TRI-STATE COLLEGE**

5105 College Avenue • Angola, Indiana

## HYDRAULIC JACK REPAIRS

**Earn While You Learn at Home**

Earn while you learn at home. Trained and qualified mechanics needed NOW to service inoperative hydraulic jacks. BIG opportunity for ambitious men. We show you HOW—in your basement or garage, spare time cash income in an expanding industry. Don't wait, ACT NOW! Get the facts.

Write for folder No. PS10 and free bonus offer.

**HYDRAULIC JACK REPAIR MANUAL CO.**
P. O. BOX 50 • BLOOMFIELD, N.J.

## LEARN TO BE A DENTAL MECHANIC

**SECURITY • PRESTIGE • GOOD PAY**

Learn at home, in your spare time, to make Crowns, Plates, Bridgework, etc. Dental Mechanics are employed by Dentists, Dental Laboratories or open your own shop, full or spare time. FULL EQUIPMENT OF TOOLS AND MATERIALS INCLUDED WITH COURSE. Low tuition. Easy Terms. Write for FREE BOOK about this money-making profession that's not affected by automation.

**McCARRIE SCHOOL OF MECHANICAL DENTISTRY**
127 So. 13th Street, Dept. 89, Philadelphia 7, Pa.

## "$7,108.50 First Year SERVICING RADIATORS!"

— Hank Konter, Newcastle, Wyo.

Make good money servicing auto-truck-tractor radiators with new Inland 1-Piece Radiator Shop. Easy to test-clean-repair radiators. Inland, world's largest radiator equip. mfr., trains you free. Small down payment starts you. Easy-pay plan lets you pay from profits. Proved merchandising assures volume. Profitable dept. for garage or service station. **WRITE for Free Book.**

**INLAND MFG. CO.,** Dept. PS-10, 1108 Jackson St., Omaha 2, Nebr.

## *Make it - Sell it - Profit!*

Costs less than lumber — perfect for homes, stores, offices, etc.

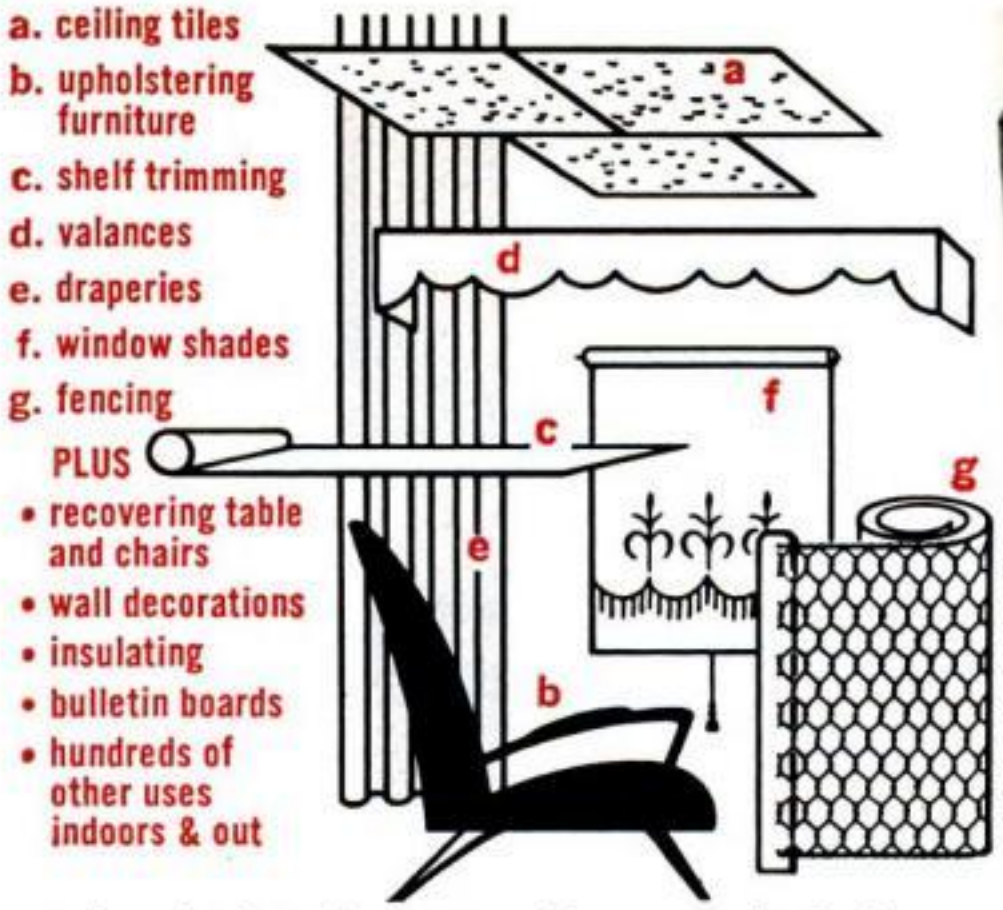
## BRIKCRETE

Make exclusive Brikcrete from materials you buy locally—sell it to hometown builders at prices outside suppliers can't match. Profits up to 100% and more. Write for FREE Book No. 2.

**W. E. DUNN MFG. CO., 422 W. 25th St., Holland, Mich.**



Urheberrechtlich geschütztes Material




**and what a honey of a gun it is!**

A real Heavy Duty Gun—"open-channel" loading for quick, easy staple replacement—easy action handle—exclusive power-dot for greater staple penetration—handle lock—built-in staple extractor—takes 5 staple sizes plus special Loktile® staples for ceiling tile installation.

**Swingline 800 Heavy Duty Tacker Gun** only $7.95
at hardware, department, variety and stationary stores

Also available: All purpose No. 101 High Compression Tacker Gun. Takes 2 staple sizes. only $4.95

**THIS SWINGLINE TACKER GUN SAYS**

# can do

**TO ALMOST EVERYTHING**

Swingline® INC.

LONG ISLAND CITY, NEW YORK 11101

WORLD'S LARGEST MANUFACTURER OF STAPLERS FOR HOME AND OFFICE

---

# U.S. GOV'T SURPLUS

***DIRECT FROM GOV'T. FOR ONLY A FRACTION OF ORIGINAL COST. BUY FOR AS LITTLE AS 2¢ AND 3¢ ON THE DOLLAR!!***

**Examples:**

***JEEPS $63.00***
***BOATS $178.00***
***BICYCLES $5.50***
***TELESCOPES $4.00***
***LEATHER BOOTS 65¢***
***TYPEWRITERS $8.79***
***AIRPLANES $159.00***
***REFRIGERATORS $5.00***
***PASS. BUSSES $208.00***

COMPLETE SOURCES AND INFORMATION ON HOW YOU CAN BUY THOUSANDS OF ITEMS FROM GOV'T—ONLY $1.00

**FREE!! FREE!!** EXTRA 48 PAGE SECTION WITH PICTURES AND PRICES OF MORE THAN 500 ITEMS. YOU CAN ORDER DIRECT BY MAIL AT RIDICULOUSLY LOW SURPLUS PRICES. YOURS FREE WHEN YOU SEND $1.00 FOR THE DIRECTORY.

***THIS IS THE WORLD'S LARGEST STOCK!!***

| | | |
|---|---|---|
| RIFLES 10.95 | PISTOL BELTS 1.05 | Life Rafts, Walkie Talkies, |
| PARACHUTES 21.95 | STEEL HELMETS 2.15 | Swords, Paratrooper |
| BOATS 16.45 | GIANT BALLOONS 1.38 | Boots, Flags, Sleeping |
| SHOES 1.65 | MODEL CANNONS 1.38 | Bags, Cots, Phones, |
| JACKETS 3.25 | BAYONETS 1.65 | Mine Detectors, Bugles, |
| TENTS 6.55 | CARTRIDGE BELTS 1.05 | Hand & Leg Irons, |
| BAYONETS 2.15 | STEEL AXES 2.70 | Blankets, Bullet Proof |
| HAND GRENADES 1.60 | CANTEENS 67c | Vests, Flares, Cartridge |
| COMMANDO KNIVES 1.38 | FOLDING STOVE 1.38 | Belts, Ammo, Rifle Scopes, |
| COMPASSES 1.05 | FIELD PACK 1.05 | Maps, Shovels, Canteens, |
| HOLSTERS 2.15 | MIRRORS 61c | Saddles, First Aid |
| MACHETTES 2.15 | FIELD JACKETS 3.25 | Supplies, Sunglasses, |
| GOGGLES 61c | AND Bunk Beds, | Mess Kits, Haversacks. |
| | | AND HUNDREDS MORE! |

**BUY ONE, TWO OR A DOZEN OF ANY ITEM YOU WANT.**

**MINIMUM ORDERS AS LOW AS $5.00 ACCEPTABLE**

**FREE HOME TRIAL COUPON**

SURPLUS BARGAINS, DEPT. 135-10
605 THIRD AVENUE
NEW YORK 16, N. Y.

I enclose $1.00. Send the combined catalog and directory immediately. I understand that my money will be refunded if I am not completely satisfied. Also I will receive a full refund with my first order of $10.00 or more.

Name _____
(Please Print)

Address _____

City _____ State _____

**FULL PURCHASE PRICE OF $1.00 REFUNDED WITH FIRST ORDER OF $10.00 OR MORE**

Urheberrechtlich geschütztes Material

# EARN $10,000 A YEAR

Let us prove that around $4,300.00 a year is the starting pay for graduates of our DIESEL-AUTO TRAINING . . . they can quickly advance to the $10,000 a year.

Play it safe . . . investigate the tremendous advantage of

**SUCCESS INSURANCE TRAINING**

THE GREATEST advancement in technical education during this century.

It means 98% of our grads placed . . . at higher starting pay . . . advanced much faster to BIG PAYING JOBS.

**EARN WHILE YOU LEARN.** We get you a part time job and housing.

**MAIL TODAY** FREE BOOKLET

Check subject of your choice in coupon

**BAILEY Technical Schools**

1645 S. Grand, Dept. PS, St. Louis 4, Mo.

Your Future in DIESEL and AUTO MECHANICS

☐ DIESEL ☐ AUTO

LEARN-BY-DOING is the training method used for more than 25 years by the WORLD FAMOUS Bailey Tech.

Name _____ Age _____

Street _____

Town _____ Zone _____ State _____

Telephone _____

---

Start Your Own Profitable SERVICE BUSINESS with Minimum Investment

**"Took in $9000 Last Year in Sparetime"**

A.I., Minnesota

## Free Booklet Tells How!

If you're interested in a business of your own and are short on capital, this may be the opportunity you've been seeking. Here's your chance to get into the profitable rug cleaning service business. Free booklet tells all about

Foley CARE

Foley Care Dept. 1003-5,
3333 Fifth St. N.E., Mpls., Minn. 55418

Please send Free "Business of Your Own" Booklet

Name _____

Address _____

City, State, Zip code _____

---

*MEN!* 60 STYLES FOR

## W-I-D-E FEET!

E to EEEEE Only - Sizes 5 to 13

Men only. Casual, dress, work shoes that really fit. Top quality, popular prices. Money Back Guarantee.

Not sold in stores

Write Today for FREE CATALOG

HITCHCOCK SHOES INC., Hingham 46-H, Mass.

---

## LAW FREE BOOK

THE LAW TRAINED MAN

Write today for a FREE copy of illustrated law book. **"THE LAW-TRAINED MAN,"** which shows how to earn the professional Bachelor of Laws (LL.B.) degree through home study of the famous Blackstone Law Course. All necessary books and lessons provided. Moderate cost; convenient monthly terms. Write for FREE law training book today.

**Blackstone School of Law, 307 N. Michigan Ave**

*Founded 1890* **Dept. 127, Chicago 1, Illinois**

---

SEALMASTER

## FLAPPER TANK BALL

QUIET, POSITIVE ACTION . . . SEALS AUTOMATICALLY. READY TO INSTALL

STOPS WATER WASTE

AT HARDWARE STORES

---

## TELLS HOW TO SELL YOUR INVENTION

If you have an invention that you believe has merit, write us at once for copy of copyrighted booklet "How to Go About Selling Your Invention." We work with manufacturers, and booklet reveals present markets, qualities of a saleable invention, current royalty rates being paid by manufacturers. Booklet is FREE, is offered to encourage new ideas we might submit to manufacturers. Just send name (no drawings, please) to

**Kessler Sales Corporation, Dept. D-710, Fremont, Ohio 43420**

---

## LEARN IBM

**AT LAST!** With **THOUSANDS** of prestige positions waiting for new data processing technicians and **PAY** scales at a **RECORD HIGH,** A.T.C.'s exclusive methods are available to you in a **SPECIAL HOME STUDY PROGRAM GEARED TO YOUR TIME AND BUDGET.** No contracts to sign . . . you pay for each lesson only when you order it! Send for free logic test to see if you can qualify. **No Cost or Obligation of course.**

**AUTOMATION TRAINING CORPORATION**

7023 E. Kirby, Dept. PS-46, Detroit 11, Mich.

---

## RUPTURED?

TEST THIS TRUSS FREE FOR 30 DAYS

Wear a Web for strong support and lasting relief of reducible inguinal rupture. If not satisfied after 30-day trial, purchase price refunded in full. Write now for free book on rupture care.

**WEB TRUSS Co., Dept. PS-10, Hagerstown, Md.**

---

## COLLEGE COURSES AT HOME

Study—on LP records—toward a college degree at home! First-year college level courses recorded by world-famous professors, including 8 Pulitzer Prize winners. Set your own pace under personal guidance of a tutor. Qualify for credit at over 100 accredited colleges. The average college graduate earns $136,000 more in a lifetime than average high school graduate. Write for free catalog.

**INSTITUTE FOR UNIVERSITY STUDIES, INC.** Dept. 49
76 Lincoln Avenue, Bergenfield, N.J., 07621



Urheberrechtlich geschütztes Material

# SAVE 1/2 ON "NEW SOUND" ELECTRONIC ACCORDIONS*

**BIG DISCOUNTS!** *Importer-to-you Prices*

**42 STANDARD AND ELECTRONIC MODELS** for Students, Teachers and Professionals

**FREE GIFTS** E-Z Lesson Course, Year's Music Supply, Music Stand, Straps, and Case... Many More!

**Rush Coupon Free Color Catalog Discount Price List**

***Easy Terms • Low as $7.95 a Month***

★Rush coupon for ***proof*** you save up to 50% off retail prices of comparable accordions! ***BUY DIRECT***—Low Importer-to-You prices. World's largest accordion dealer. All famous makes. 42 New ***Electronic*** & Standard models, Amplifiers. Popular "Button type" accordions, too! Lifetime Performance Policy. Money Back Guarantee. Easy terms. Big Trade-In. Color Catalogs, Selection Guide and Discount Prices—FREE!

**5 Day Home Trial**

**ACCORDION CORP. OF AMERICA**
**Dept. P-105, 5535 W. Belmont Ave., Chicago, Ill. 60641**

**Accordion Corp. of America, Dept. P105**
**5535 W. Belmont, Chicago, Ill. 60641**
Send FREE Catalog of Accordions, Amplifiers —Selection Guide, Color Chart, Discount Prices.

NAME_____

ADDRESS_____

CITY_____ STATE_____

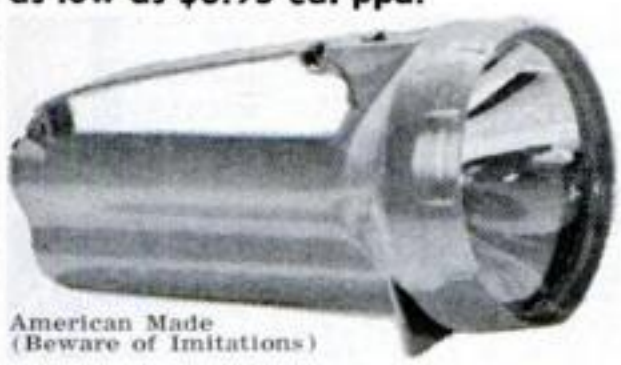
☐ Check here if you have a Trade-in.

---

# 80,000 CANDLEPOWER

From only six regular flashlight batteries in 3-cell length

**as low as $6.95 ea. ppd.**



American Made
(Beware of Imitations)

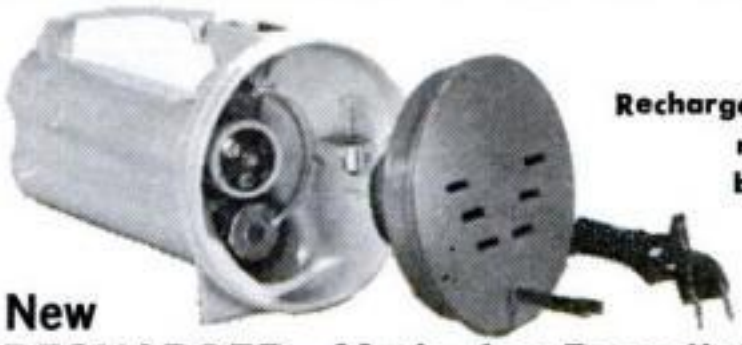
## UNDERWATER BEAM LIGHTS

Used by skin divers, hunters, fishermen, shippers, watchmen. "Too bright to read by," says one enthusiast. Special die-casting process gives reflector the most distance, greatest brilliance of any flashlight made.

## TREMENDOUS PIERCING BEAM ON LAND — CUTS thru FOG & SMOKE

Made to pierce murky depths and withstand pressures of underwater operation. On land its beam leaps out for twenty miles. 80,000 candlepower illuminates objects clearly a mile away. Pierces smoke-filled areas. Stands alone on special foot. Floats in water. Unbreakable lens. You can jump on this flashlight.

**1 at $10.95.....2 at $9.95 ea.** ***All Prices***
**3 at $8.95 ea.....6 at $6.95 ea.** ***Postpaid***



**Recharge without removing batteries!**

## New RECHARGER—Made for Beamlight

Just unscrew head, screw on recharger, and plug into 110 volt outlet. Bring up to full charge up to 50 times! The most effective charger made. Charge any D cells in your beam light!

**COUNTRY CLUB BEAM**
**349 Manufacturers Exchange**
**Kansas City 5A, Mo.**

☐ $7.95
☐ $5.95 with beam light

---

# Earn Extra $$$ RIGHT AWAY

# You Can Be a SKILLED LOCKSMITH

### LEARN AT HOME

Here is one field where mature men can earn better pay—have unlimited job opportunities. No need to wonder how you'll make ends meet if laid off, replaced by a machine, disabled, forced to retire! Locksmithing skill lets you say goodbye to such worries—CASH IN FAST in a big opportunity job or your own high-profit business spare-time, or full-time.

### All Locks, Keys, Tools, Materials, & Equipment Supplied.

Age, education, minor physical handicaps don't matter in this booming profession. As little as one hour a week doing real jobs on all kinds of locks and keys under expert guidance brings quick mastery and ends job and income worries forever.

### FREE Book, Sample Lesson Pages.

Send for FREE illustrated book and sample lesson pages today. No salesman will call. Only school of its kind. Licensed by N.J. State Board of Education; Accredited Member, National Home Study Council; VA Approved.

**LOCKSMITHING INSTITUTE**
*Division of Technical Home Study Schools*
**Dept. 111-105, Little Falls, N.J. 07424**

**FINDS 3-WAY INCOME INSURANCE**

"I earned $2,901.77 while learning locksmithing and now make $5,000 a year—doubling my income. Worries about layoffs, retirement, more money are over for me — thanks to the Locksmithing Institute Course!" — Stanley Nowak, Saginaw, Mich.

**306 Pieces of equipment LOCKS, PICKS and TOOLS supplied for use with course.**

**SEND FOR FREE BOOK**

**LOCKSMITHING INSTITUTE, Dept. 111-105, Little Falls, New Jersey 07424**

*Est. 1948*

**Please send FREE Illustrated Book—"Your Big Opportunities in Locksmithing," complete Equipment folder and sample lesson pages—FREE of all obligation —(no salesman will call).**

Name ..... (Please Print)

Address .....

City ..... State ..... Zip .....

---

# LEARN MEAT CUTTING AT NATIONAL

**Pay After Graduation**

The steady dependable trade of Meat Cutting taught easily in 8 short weeks. YOU LEARN BY DOING under actual meat market conditions in big modern school at Toledo.

For beginners or men with experience. Get a profitable store of your own. Remember, PEOPLE MUST EAT! Big pay jobs. Free employment help. Thousands of successful graduates.

Buying, cutting, percentage, pricing, advertising, selling, etc. A complete retail meat education. **National School established 42 years. Get National training NOW.** Pay your tuition in easy monthly payments after you graduate. Send coupon for FREE 40 page school catalog — TODAY. G.I. approved

**National School of Meat Cutting, Inc., Dept. 51-Z, Toledo 4, Ohio**

**Send me your FREE school catalog on National Training at Toledo in Meat Cutting, Meat Merchandising and Self Service Meats. No obligation. No salesman will call.**

Name_____ Age_____

Address_____

City_____ State_____

**Approved for Veterans**

Urheberrechtlich geschütztes Material

# AUDEL GUIDES

| | | |
|---|---|---|
| No. 8 | **Carpenters & Builders Guide. 4 Vols.** 1900 pages | $10.50 |
| No. 1 | **Auto Mechanics Guide.** 1132 pages | 6.00 |
| No. 15A | **Electric Library. 10 Vols.** 5558 pages | 25.00 |
| No. 2 | **Home Appliance Service Guide.** 832 pages | 6.95 |
| No. 14 | **Refrigeration & Air Conditioning Guide.** 1090 pages | 6.00 |
| No. 26 | **Masons & Builders Guide. 4 Vols.** 1440 pages | 10.50 |
| No. 6 | **Plumbers & Steamfitters Guide. 4 Vols.** 1833 pages | 10.50 |
| No. 3 | **Radio-TV Library. 2 Vols.** 960 pages | 9.50 |
| No. 12 | **Machinists & Toolmakers Handy Book.** 1256 pages | 6.95 |
| No. 10 | **Welders Guide.** 606 pages | 4.95 |
| No. 49 | **Outboard Motor & Boating Guide.** 414 pages | 4.00 |
| No. 4 | **Handy Book of Practical Electricity.** 1052 pages | 5.95 |
| No. 25 | **Blueprint Reading for Mechanics & Bldrs.** 430 pgs. | 3.95 |
| No. 27 | **Electric Motor Guide.** 1036 pages | 5.95 |
| No. 11 | **Mathematics & Calculations for Mechanics.** 672 pages | 4.95 |
| No. 53 | **Foreign Auto Repair Manual.** 592 pages | 5.00 |
| No. 5 | **Truck and Tractor Guide.** 908 pages | 5.95 |
| No. 7 | **Painting & Decorating Manual.** 592 pages | 4.95 |
| No. 48 | **Gas Engine Manual.** 468 pages | 4.00 |
| No. 28 | **Oil Burner Guide.** 420 pages | 3.95 |
| No. 9 | **Diesel Engine Manual.** 544 pages | 6.00 |
| No. 29 | **Sheet Metal Pattern Layouts.** 1152 pages | 7.50 |
| No. 54 | **Programmed Basic Electricity Course.** 272 pages | 4.00 |

**10 DAY FREE EXAMINATION.** SEND NO MONEY. We'll send you any Audel Guides for FREE trial. If you decide to keep the books you pay only $3 per month under our easy-pay plan. Simply circle the books you want below and we'll send them at once. If you're not completely satisfied, return them to us.

**THEODORE AUDEL & CO.** · Since 1879 S-105
**4300 W. 62nd St., Indianapolis, Indiana 46206**

**MAIL COUPON TODAY!**

Please mail me for 10 days FREE EXAMINATION the books circled below. I agree to mail $3 in 10 days for each book or set ordered, and to mail $3 a month for each book or set, until I've paid the purchase price, plus shipping costs. If I'm not completely satisfied with my Audel Guides I may return them.

Name_____

Address_____

Employed by_____

1 2 3 4 5 6 7 8 9
10 11 12 14 15A 25 26
27 28 29 48 49 53 54

☐ **SAVE SHIPPING COSTS.** Check here if you enclose complete payment (plus sales tax, if any). We pay postage.

☐ I've bought Audel books before.

# START A MONEY-MAKING BUSINESS FOR LESS THAN $50!

You can have your own lifetime business right at home . . . work in spare time . . . and make up to $200 a month CASH! My FREE PLAN gives you all the facts: How to start, how to grow. You don't need previous experience. You don't have to sell. I'll even finance you. People bring you the work and pay cash. Over 90c of every dollar you collect is clear cash profit. And you work when you want to. Let me prove you can't find a more certain, lower cost, higher paying business of your own.

**FREE BOOK**

Just Mail Coupon—No Salesman Will Call

**BELSAW SHARP-ALL CO.,** Stan Field, President
**706D Field Bldg., Kansas City, Mo., 64111**

Name_____

Address_____

City_____ State_____

# BUY FACTORY DIRECT!

Deluxe kit (shown) with lights, fenders . . . $129.95

**mini-bike kit!**

**$109.95**

**$10 Down**
**$ 7 Month**

Assembled . . . $119.95

Build your own mini-bike in about 2 hours! No welding! Use household tools. Speeds to 25 mph. Ideal for errands, school or fun!

Deluxe assembled (shown) . . . $189.95

**RUSH 25¢ FOR BROCHURE TO**

**TIME PAYMENT**
Now you can pay-as-you-ride with Bird engineerings' Time Payment plan! (You must be 21 or have parents sign).

**STANDARD EQUIPMENT**
- 2½hp 4 cycle engine
- Precision welded frame
- Complete instructions!

MANY MODELS

**BIRD engineering, Box 427, Dept. PS-WK-10, Omaha, Nebr. 68101**

# NO JOB WORRIES

PLASTEX INDUSTRY needs manufacturers on small scale for big production of Lamps, Clock Stands, Art Goods, Novelties in Plastic Marble imitation. No experience necessary. ½¢ material makes regular 10¢ store sellers. Moulds furnished for fast production. Small investment brings good profit. Big wholesale orders now being placed. Ambitious men have chance for real prosperity and job security. Our NEW FREE booklet will interest and benefit you.

PLASTEX INDUSTRIES, Dept 2, 3400 Third Ave. New York 56 N.Y.

# 75 POWER TELESCOPE 25X-45X-75X $3.98

**NEW** 3 in one telescopes, 3 variable 25X 45X-75X magnification. Brass bound. 25 power for ultra bright images 45 & 75 power for long range. Guaranteed to bring distant stars, moons, objects, sports 75 times closer.

Most powerful scope sold anywhere near this amazing low price. American made, 5 sections. Opens 36", closes 1 ft.; contains 4 ground & polished lenses. Can also be used as powerful compound microscope. Mass production enables us to offer telescope complete at $3.98 postpaid. Money back guarantee.

**CRITERION CO., Dept. PSB-31; 331 Church St., Hartford, Conn.**

# Say YES to C.T.I.

**Better Training, Bigger Paychecks are the reasons why!**

- **Industrial Electronics • Color and B&W TV**
- **Air Conditioning, Refrigeration & Heating**
- **Auto Mechanics • Building Construction**

Circle course wanted. Send for FREE FACTS!

**COMMERCIAL TRADES INSTITUTE,** Dept. 1-K
1400 W. Greenleaf • Chicago, Ill. 60626
*Accredited Member National Home Study Council*

# You Can Have a HE-MAN Voice

STRENGTHEN **your** voice this tested scientific way. Yes—you may now be able to improve the POWER of your speaking and singing voice . . . in the privacy of your room! Self-training lessons, mostly silent. No music required.

## FREE BOOKLET

Write **today** for Eugene Feuchtinger's great booklet "How to Develop a Successful Voice." It's absolutely **FREE! You must state your age.** Booklet mailed postpaid in plain sealed envelope. No salesman will bother you. Send your name and age RIGHT NOW!

**PREFECT VOICE INSTITUTE, 325 W. Jackson Blvd., Studio KW-1, Chicago 6, Ill.**

Urheberrechtlich geschütztes Material

*To Home or Shop...*
*for business or personal use!*

"Messenger" Citizens Radio opens up the exciting field of personal communications to everyone — in any application. Used by builders, contractors, trucking, delivery services, garages on-the-job—ideal for sportsmen, hunters, fishermen and campers! Anyone can operate — license issued on request. Investigate the "Messenger" line — nation's most popular, most reliable Citizens Band equipment!

**YOUR OWN**
# 2-WAY RADIO

Write Today

**E. F. JOHNSON CO.**
2021 10th Ave. S.W. • Waseca, Minn. 56093

JOHNSON®

. . . and years of future security in the multi-billion dollar construction industry, in this country and *overseas!* Learn how at National, the original school of heavy equipment operation. For men ages 17 to 56. Amount of previous *education no barrier.* National is NOT a correspondence school. You train on school-owned diesel-engined machines at National's huge proving ground in North Carolina. Full 220 and 440 hour courses. Full-time Job Advisory and Counselling Director for the exclusive benefit of graduates. VA approved. Payment plans available. Write TODAY for FREE catalog.

*Since National School was founded ten years ago, students from all 50 states and 33 foreign countries have been enrolled. Hundreds of graduates are now working in construction for higher wages than they ever made before.*

**NATIONAL SCHOOL**
**OF HEAVY EQUIPMENT OPERATION, Dept. A-66**
**P. O. Drawer 1686, Charlotte, N. C.**

**Please send me FREE illustrated school catalog and complete information. I understand there's no obligation.**

**Name**.....**Age**.....

**Address**.....

**City**.....**Zone**.....**State**.....

# New! The only lever action repeating Pellet rifle!

**14 shots in 14 seconds!**
**Crosman 99 a man-size .22 cal. Pellgun® $29.95***
Less 'Scope

Big gun weight, big gun feel, big gun action! Handles like a big-game rifle. Lever cocks and loads with smooth, short stroke—shoots 3 times faster than any pellet rifle. Magazine holds 14 Super Pells®. Rifled barrel. Fully adjustable open rear sight is standard. Model 499 Crosman Master Mount and Superscope installed in seconds. Hand-filling forearm and Monte Carlo stock gleam with fine dark-walnut finish. This is a *man's* gun—a *shooting man's* gun.

**INSTANT CHOICE OF POWER**—for indoor target shooting or outdoor shooting. Two hammer positions give choice of low or high power. Low power provides 60-70 economy shots per $CO_2$ Powerlet®! High power provides 30-40 shots.

**FREE BOOK:** "More Shooting Fun" describes all Crosman guns. Write Dept. PS105.

SEE THE 99 WHEREVER FINE GUNS ARE SOLD

Crosman
ARMS CO., INC.
Fairport, N. Y., U.S.A.

Crosman Master Mount and Superscope Model 499 **$9.98*** (illustrated)

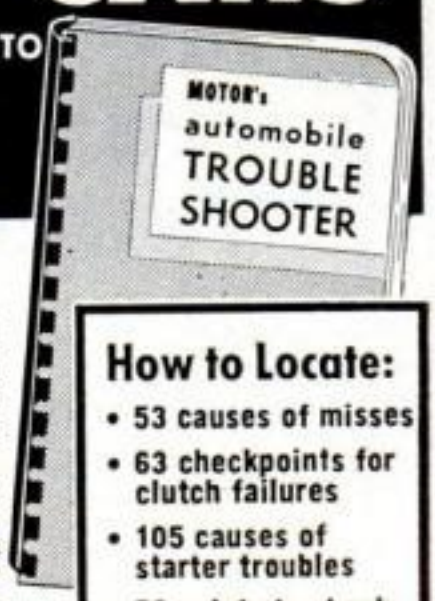
*Suggested U.S. Retail



Urheberrechtlich geschütztes Material

# Save TIME-WORK-MONEY FIXING CARS

with MOTOR's Brand New AUTO "TROUBLE SHOOTER"




### Spots ANY of Over 2,300 Car Troubles in a Flash!

Now you can put your finger instantly on cause of any car trouble! MOTOR'S new TROUBLE SHOOTER lists symptoms and causes of trouble in engines, ignitions, generators, starters, alternators, voltage regulators, clutches, transmissions (stick shift and automatic), rear axles, front suspensions, steering gears and brakes (mechanical and power), power tops, seats and windows, wipers. Gives reasons for vapor lock, carburetor icing, knocks, pinging — much more!

NO-RISK OFFER! Mail coupon with only $2. Use TROUBLE SHOOTER for full week. If not delighted return it for full refund. Mail coupon to MOTOR *Book Dept.*, 250 W. 55th St., New York 19. N. Y.

**How to Locate:**

- 53 causes of misses
- 63 checkpoints for clutch failures
- 105 causes of starter troubles
- 56 points to check when engine stalls
- 2,110 causes for automatic trans. troubles

*Much, Much More!*

**MOTOR BOOK DEPT., Desk A006**
**250 West 55th St., New York, N. Y. 10019**

Rush me MOTOR's new TROUBLE SHOOTER. I enclose $2 (check or money order) as payment in full. If not 100% satisfied, I may return book for full refund.

Print Name.....

Address.....

City & State..... Zip Code.....

---

# JAMES BARGER EARNS while he LEARNS UPHOLSTERY!

M.U.I. student James L. Barger of Milroy, Pa. "About the middle of the course I started receiving work from people around town and even an occasional job out of town . . . At this time I have jobs scheduled for the next two months" . . . Sincerely, James L. Barger

**LIFETIME SECURITY • BIG PROFITS**
**No Ceiling on your Income • These are yours in UPHOLSTERY!**

**TAKE YOUR CHOICE!**
1. Skilled upholsterer in shop or factory, top wages.
2. Home-Garage reupholstering business of your own, independence, top earnings.

**UPHOLSTERY FITS YOUR BILL.** You don't even need to quit your present job. You start learning at home, spare time, immediately. Within **two weeks** you are able to do profitable jobs!

Make a **ROOM-FULL** of beautiful furniture... **YOURS TO KEEP OR SELL!**

**AVAILABLE WORK RUNS TO MILLIONS!**
Sofas, sectionals, arm-chairs, footstools, built-ins, breakfast nooks — slipcovers, drapes, cushions — all the upholstery in cars, trailers, boats, campers — there is never an end to it! There's a real gold mine in making old, worn out, worthless furniture into something new, appealing, modern and glamorous! An automation proof, depression proof industry! Men, women or family teams, all ages, make big money in upholstery. Trained upholsterers are scarce, earn TOP MONEY, are needed **everywhere!**

**UPHOLSTERY WORK INCREASES "LIKE MAGIC."**
. . . when **you** combine know-how and ambition! James Barger found it out. So can you! Why work for a low weekly paycheck? Get off that treadmill! Get through UPHOLSTERY! Here's the way you can do it!

**FREE TOOLS**

**FREE BOOK**

**MEN... WOMEN... ALL AGES FIND OUT!**

Free book gives you most complete and valuable down-to-earth information ever compiled on the amazing field of Upholstery. Start in your home or garage . . . in spare time. Start small, GROW BIG! All it takes is a postcard or letter. Mail one NOW!

Here it is! You have nothing to lose and a world to gain!

**JUST MAIL This Coupon TODAY!!**

Mr. Harvey Emerson, President
**MODERN UPHOLSTERY INSTITUTE,** Box 899-CL, Orange, Calif.

Dear Mr. Emerson: Please send me your big free and postage prepaid Upholstery Guidebook and sample lesson. No salesman will call.

NAME _____ AGE _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

---

# Art LESSONS—$6 a month

Study Art for pleasure and profit. Learn Drawing, Painting, Advertising Art at home in spare time for only $6 a month. Assignments corrected with overlays and returned to you by mail. Est. 1914. Write for FREE BOOK. No salesman will call **WASHINGTON SCHOOL OF ART, Studio 1510, Port Washington, L.I., New York 11050.** Accredited, National Home Study Council. *Tear out as reminder.*

---

**Learn how to become a**
## GAME WARDEN
**GOV'T HUNTER, FORESTER, WILDLIFE MANAGER**

Exciting job openings now for qualified men who love outdoor work. *Protect forests and wildlife—arrest violators!* Good pay, security, prestige and authority for respected career Conservation Officers. *Easy home-study plan!* Send for FREE Fact BOOK, aptitude QUIZ, SUBSCRIPTION to Conservation magazine. State age.

**NORTH AMERICAN SCHOOL OF CONSERVATION**
**941 N. Highland Ave., Dept. 18A Los Angeles, Calif. 90038**

---

# PROFIT IN YOUR SPARE TIME

**SMALL ENGINE REPAIR PAYS BIG!**
Outboard • Powermower • Chain Saw • Tractor
**MAKE EXTRA MONEY** — or fix your own engines and SAVE! Illustrated, easy-to-learn Home Study Course qualifies you as expert. Free information. Write today!

**LINCOLN TECHNICAL INSTITUTE**
**Suite 10-G, 472 Market Street, Newark 5, N.J.**

---

## HOME-IMPORT BUSINESS—Make Big Profits

New Drop Ship Plan offers you first day profits! Deal direct with overseas sources at prices shown. Dazzling bargains with no investment. Full or spare time. Write for FREE BOOK today to . . .

**MELLINGER, 1554 S. Sepulveda, Dept. P24A, Los Angeles 25**

---

## HEY! I'M IMPORTANT

I'm built to save you money. I attach magnetically to the dash of your car. No holes to drill. Clip on wires. You'll always know your lights are on when you park. I cost only $2.98 postpaid. I'm waiting for you at:

**SAVE MONEY**

Full one year money back guarantee.

**LITS ON INC.**
P.O. BOX 671 HOLLY HILL, FLORIDA 32017

---

## SAILBOAT KITS

Send for free complete color catalog of popular Snipe, Windmill, and Blue Jay sailboats and accessories. Also cruisers, runabouts, catamarans, hydrofoils, etc.

**TAFT MARINE WOODCRAFT**
Dept. PS105 636 39th Avenue N.E.
Minneapolis, Minnesota 55421

---

## Color DIAL TELEPHONES $10.95

Factory rebuilt Western Electric in white, beige, ivory, pink, green, or blue. If 4 prong plug is required add $2.00. Fully guaranteed. Write for free list. All shipments FOB.

**SURPLUS SAVING CENTER**
**Dept. 10A5, Waymart, Pa.**

Complete

Urheberrechtlich geschütztes Material

# NEW RUBBER STAMP BUSINESS PAYS BEGINNERS UP TO $9.20 AN HR.

## *START AT HOME IN SPARE TIME*

**THIS LITTLE TABLE TOP MACHINE MAKES EVERYTHING SIMPLE & EASY**

MAIL THIS

The multi-million dollar Rubber Stamp business—once controlled by a few big companies—is now being taken over by small operators—one in each community throughout the United States. Men and Women who have this inexpensive machine can turn out huge quantities of Rubber Stamps with special wording that buyers once were forced to buy from big cities. Material costing only 27c makes a stamp that sells for $1.80. The machine that does the work is simple and easy to operate and it turns out as many as six Rubber Stamps at a time, each with different wording such as names, addresses, notices, stock numbers, prices and other "copy" needed by offices, factories and individuals. Working full capacity, it can earn as much as **$9.20 an hour for the operator!** Now you can get into the big-pay business yourself, with your own home as headquarters. You don't need experience. We supply everything, including complete instructions and eight ways to get business coming in fast. **We even help finance your start.** Start making up to $9.20 an hour from the very beginning. Cash in on the profitable Rubber Stamp business in your community, right away. We'll mail full particulars FREE and no salesman will call. Be first in your locality. Rush coupon or send your name on postcard now to:

**RUBBER STAMP DIV., Dept. R-3-LW**
**1512 Jarvis Ave. • Chicago, Illinois 60626**

**RUBBER STAMP DIV.** *FREE!*
**1512 Jarvis Avenue Dept. R-3-LW, Chicago, Ill. 60626**

Please rush full particulars about your financing plan and the little machine that can get me started in the profitable Rubber Stamp business at home in spare time. Everything you send me is FREE and no salesman will call.

Name _____
Address _____
City _____
Zone _____ State _____

---

GUNK G-P

BRUSH IT ON
HOSE IT OFF

# CLEANS

**POWER MOWERS**
**GARAGE FLOORS**

AT HARDWARE, FARM AND AUTO STORES

---

# REAL ESTATE

BE A BROKER

**PAYS BIG! SEND FOR FREE, BIG, ILLUSTRATED CATALOG NOW!** Graduates report making substantial incomes. Start and run your **own business quickly.** Men, Women, all ages, learn easily. Course covers Sales, Property Management, Appraising, Loans, Mortgages, & related subjects. **STUDY AT HOME** or in classrooms in leading cities. **DIPLOMA AWARDED. Write TODAY for FREE Booklet!** Accredited Member National Home Study Council. (Established 1936)

FREE BOOK TELLS HOW

**WEAVER SCHOOL OF REAL ESTATE**
**3521-S Broadway** **Kansas City, Mo. 64111**

---

# ALUMINUM SIDING

**Learn how you can earn up to $1000.00 per sale, showing our quality aluminum siding on your home.**

TO: ALUMINUM INDUSTRIES, Dept. C-105
KANSAS CITY 11, MISSOURI
Please send me complete information
My Name _____
Street _____
City _____ State _____

---

# YOU EARN HIGH INCOME And UNUSUAL RESPECT

As a skilled Graduate of the IMPERIAL DETECTIVE ACADEMY. This is NOT an Ad gimmick, but facts from Student grads in paying Jobs. YOU can do the same!

Men and Women exactly like YOU have mastered the Techniques of an expert Detective in their spare time. Our Home Study Training is not difficult or unusual, except the variety of Cases YOU learn to handle tactfully and expertly. IMPERIAL Instructors teach you in easy, illustrated Lessons the How, When, Why and Where of civil and criminal Investigation, preparing YOU for exciting Income Jobs.

Send for our Booklet, "How To Become An Expert Detective Investigator", telling the story of IDA and Home Study Course.

**Mail Coupon or *Letter promptly, copy of Investigator's DICTIONARY sent you Free!**

**IMPERIAL DETECTIVE ACADEMY**
4900 Glenway Ave, P-9, Cincinnati, Ohio
Please send Booklet and Information

NAME _____ Age _____
STREET _____ Phone _____
CITY _____ State _____ Zip _____
* A Letter helps us to serve you Better!

---

# ENGINEERING

**HEALD**

**TRAINED ENGINEERS** are holding High Paying Positions in Industry, State and Federal Government.

**AMERICAN INDUSTRY NEEDS TRAINED ENGINEERS NOW**

## BACHELOR OF SCIENCE DEGREE, 30 MONTHS

**SAVE 2 YEARS' TIME**

**B.S. Degree Courses:**

- ☐ Electrical Engineering
- ☐ Electronic Engineering
- ☐ Mechanical Engineering
- ☐ Civil Engineering
- ☐ Architecture

**Diploma Courses:**

- ☐ Radio-Television Plus Color Technician
- ☐ Electronic Technician
- ☐ Architectural Drafting
- ☐ Mechanical Drafting
- ☐ Structural Drafting

**New Term Starts Quarterly**

**Write Today for Free Information.**

**HEALD'S ENGINEERING COLLEGE**

**Van Ness at Post, Dept. PS-1065** **San Francisco, California**

NAME _____
STREET _____
CITY _____ STATE _____



Urheberrechtlich geschütztes Material

# FREE

## GIANT NEW CATALOG

100's OF BARGAINS NOT IN ANY OTHER CATALOG
1966 ANNUAL CATALOG
RADIO · TV · ELECTRONICS
B-A
SINCE 1927
TUBES, PARTS ETC. AT LOWEST PRICES
TOP VALUES IN POWER & HAND TOOLS
EVERYTHING IN HI-FI AND STEREO
SAVE ON CAMERAS FILM & PHOTO EQUIPMENT
SAVE UP TO 50% ON CHOICE KITS

**100's OF BIG PAGES CRAMMED WITH SAVINGS**

**BURSTEIN-APPLEBEE CO.**

Dept. PS, 1012 McGee, Kansas City, Mo. 64106

☐ Rush me FREE 1966 B-A Catalog.

SEND FOR IT TODAY

Name .....

Address .....

FREE

City ..... State .....

Please be sure to show your Zip No. .....

---

# FREE OUTFIT STARTS YOU IN BIG MONEY SHOE BUSINESS!

Run your own profitable 'shoe store' business *from home* in spare or full time. We give you—*FREE*—complete Starting Outfit that makes you *$217.00 EXTRA each month for just 2 easy orders a day.* You feature 275 fast-selling dress, sport, work shoe styles for men and women. Air-cushion shoes, many other special features! Sizes 2½ to 16—widths AAAA to EEEE. Draw on 300,000 pair stock. Your own shoes FREE. Discounts to your family. Prizes, bonuses—even a new car—at no cost to you. Rush postcard for your FREE Starting Outfit today... Now!

**MASON SHOE,** Dept. F-989 **CHIPPEWA FALLS, WIS.**

---

# ELECTRONIFY YOUR CAR'S IGNITION SYSTEM

*ONLY $24.95*

**INCREASE SPARK-PLUG & POINT LIFE!**

**IMPROVE GAS MILEAGE!**

**GE-PROVED CIRCUITRY!**

NEW Techni-Kits Capacitor Discharge System (CDS) installs in any car in minutes. Latest GE circuitry gives you maximum reliability and results. Get the best for your money! Send $24.95 today, plus $1 for post and ins.

**TECHNI-KITS INC. Dept. HJ, 350 Broadway, N.Y.C. 10013**

---

# INVENTORS

**PATENT SEARCHES IN U.S. PATENT OFFICE**

Patent Development Engineering and Patent Sales Promotion

Send for Free Invention Certificate and Patent Information

**GEORGE SPECTOR** Licensed Patent Engineer

U.S. Patent Office Former Examiner, 3615 Woolworth Bldg., New York

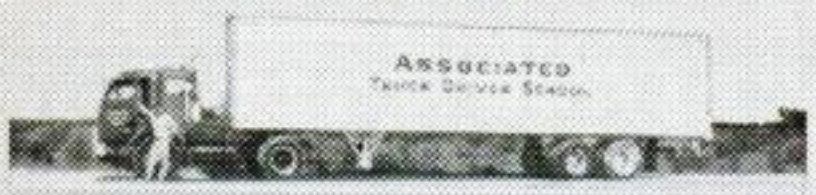
---

# •MEN• Get a man's Job!!!

Earn up to $200 per week in the Construction or Trucking Industries, on Jobs that Offer:

• SECURITY • TRAVEL • VARIETY • OUTSIDE WORK

## DRIVING




## TRACTOR-TRAILERS

• MACKS • WHITES • GMC'S • KENWORTH
• INTERNATIONALS • PETERBILTS • DIAMOND T'S

*"THE BIG DIESEL RIGS"*

*OR*

## OPERATING

• BULLDOZERS
• SCRAPERS
• GRADERS
• BACK HOES
• DRAG LINES
• CLAM SHELLS

## HEAVY EQUIPMENT

Short practical training program will qualify you for one of the job openings in these rapidly expanding Industries. For complete information: Send Name, Address, Age, Phone Number, and Working Hours to

**ASSOCIATED HEAVY EQUIPMENT SCHOOLS, INC.**
**1141 NE 79th STREET, MIAMI, FLORIDA 33138**

---

# SAVE $80

# AIR CONDITION YOUR OWN CAR

Easy! We supply everything you need, kit, tools, illustrated step-by-step instructions. Just 4 hours to install. Made by leading auto air conditioning manufacturer. 12 month, 12,000 mile warranty. Our price to you just $149 (you save at least $80). Send $1 for complete instructions, applicable against purchase price. Please state make and year of car.

**COMFY-KIT** 1707 E. Ohio Street, Dallas, Texas Dept. 410

---

**GUARANTEED FASTEST WAY to he-man strength! Famous DAN LURIE BARBELLS**

**SEND FOR FREE GIANT CATALOG**

| Factory Prices | Cast Iron | Semi-Steel |
|---|---|---|
| 50 lb. Set.. | $9.48.. | $10.48 |
| 100 lb. Set.. | 15.98.. | 18.98 |
| 150 lb. Set.. | 23.48.. | 27.48 |
| Extra Wts.. | 16c lb.. | 18c lb. |

**$9.48** Plus **Free** $10 Course

MONEY BACK GUARANTEE—Send 50% in check or money order F.O.B. Plant Brooklyn, New York. Balance C.O.D.

**DAN LURIE BARBELL CO., 1661 S-10 Utica Ave., Dept. 570K, Brooklyn 34, N.Y.**

---

# YOU HELP MORE THE UNITED WAY



Urheberrechtlich geschütztes Material

# Planer•Molder•Saw!

Now you can use this ONE **power-feed** shop to turn rough lumber into moldings, trim, flooring, furniture . . . ALL popular patterns. RIP . . . PLANE . . . MOLD . . . separately or all at once with a one HP motor. Use 3 to 5 HP for high speed output. Low Cost . . . You can own this power tool for only **$30.00** down payment.

*Send postcard today for complete facts.*

**BELSAW POWER TOOLS,** 926 Field Bldg., Kansas City 11, Missouri

---

SEND FOR *JEWELRY CRAFTS* FREE CATALOG

*Lapidary — rockhounding — jewelry making . . . add up to a fascinating creative art!*

JEWELRY CRAFTS CATALOG FREE

BIG SAVINGS NOW
**ROCKHOUNDS**
UP TO 33% OFF

over 10,000 items from all parts of the world.

MACHINERY — SUPPLIES — ETC.
MOUNTINGS — BOOKS — CRAFT TOOLS
STONES — JEWELRY MATERIALS

**GRIEGER'S, INC.**
Dept. 35 —1633 E. Walnut — Pasadena, Calif.

---

# MOTOR-MEDIC

- REDUCES ENGINE WEAR
- MAKES OIL LAST LONGER
- STOPS OIL BURNING

*At Service Stations and Auto Supply Stores*

---

GET INTO **ELECTRONICS**

V.T.I. training leads to success as technicians, field engineers, specialists in communications, guided missiles, computers, radar, automation. Basic & advanced courses. Electronic Engineering Technology and Electronic Technology curricula both available. Assoc. degree in 29 mos. B.S. obtainable. G.I. approved. Start Feb. Sept. Dorms, campus. H.S. grad. or equivalent. Catalog.

**VALPARAISO TECHNICAL INSTITUTE**
DEPARTMENT S, VALPARAISO, INDIANA

---

# Borrow BY MAIL

$40 Per Month Repays $1,009.36

Cash YOU WANT

Enjoy the things you want NOW with a confidential *LOAN-by-MAIL* — get any amount, $100 to $1,000. Pay back in small monthly installments to fit your paycheck. No co-makers. Also, Credit Life Insurance is available, at nominal cost, which will pay the balance of your loan in case of death. No matter where you live, rush this coupon now. Loan Order Blank mailed FREE in a plain envelope. No obligation. Act!

| Cash You Get | 30 Monthly Payments |
|---|---|
| $104.65 | $5.00 |
| 293.02 | 14.00 |
| 532.26 | 25.00 |
| **Cash You Get** | **36 Monthly Payments** |
| $819.57 | $33.00 |
| 1009.36 | 40.00 |

**DIAL FINANCE CO., 410 Kilpatrick Bldg.**
**Dept. 10-094 - Omaha, Nebraska 68102**

**DIAL FINANCE CO., 410 Kilpatrick Bldg.** **NO AGENT WILL CALL**
**Dept. 10-094 - Omaha, Nebraska 68102**
Please rush FREE Loan Order Blank.

*Name* _____

*Address* _____

*City* _____ *State* _____ *Zip Code* _____

*Amount you want to borrow* $ _____

---

NEWEST IN
# HULL COMPASSES
FOR CARS AND BOATS

New models that come with leather-like cases, instantaneous dash mount and windshield mount with pressure-adhesive. See dealer or write for lit.

FIRST IN ACCURACY, EASE OF USE

HULL MFG. CO. • Box 246-E10 • Warren, Ohio

---

# "TOOK IN $217 FIRST 10 DAYS"

*Some make more, some less . . .*

**We help you to start Your Own All-Year Business**

***Make Big Money!*** With our easily operated, highly efficient Wall Washer, Charles Stelle took in $217 in first ten days. E. L. Goss took in more than $10,000 in one year. G. H. Jones wrote, "*I made a net profit of $1200 on one job.*" And no wonder—this machine washes walls 6 times faster and better than by hand and with no mess—no drop cloths needed.

**Your Money-Making Opportunity** • We want more men to go into this profitable business for themselves and enjoy independence—freedom from layoffs and bosses. Customers everywhere—homes, offices, schools, churches, hotels, etc. How much you earn depends largely on you, but we help you to start and work with you for your success. Training and consulting with experts is available at no additional cost. What you take in is mostly profit. No need to rent shop or office; operate from home. Can start spare-time until your full time is justified.

**OURS IS NOT A LEASE ARRANGEMENT** • You are free to operate in an independent manner. *You* sign no contract. *You* own the deterger outright and are always *your own boss* . . . and every dollar you take in is *yours* to keep. *You* pay no fees, or dues, or royalties to anyone and enough supplies come with it to return far more than your investment. Many earn the cost of the deterger in a week or two. It costs nothing to get the details . . . write **TODAY.**

***Lose No Time—Send Coupon Today for All the Facts***

**FREE BOOK! MAIL COUPON TODAY!**

**VON SCHRADER MFG. CO.**
**N-11 "W" Pl., Racine, Wisconsin**

Send at once (no obligation) your **FREE** booklet containing information about your WALL WASHING MACHINE and how I can start my own permanent, profitable business.

Name _____

Address _____

City _____ State _____ Zip _____



Urheberrechtlich geschütztes Material

# Detroit report...

KELSEY-HAYES WILL MAKE INSTANTOR BRAKES. The Instantor brake is a new system that uses the forward motion of a car to build up line pressure, obviating the need for power assist. Rockwell-Standard developed the system [PS, June] and has now entered into a licensing agreement with Kelsey-Hayes, who will offer the Instantor brake to auto makers for 1967 cars and trucks.

**Chevrolet's "Anti-Mustang"** is taking shape. First indications are that it will be a front-engine car with rear-wheel drive, probably based on a shortened Chevy II underbody with coil springs at the front, tapered single-leaf springs at the rear. Slightly smaller and lighter than the Mustang, it has a long hood and the shortest deck since built-in trunks were invented. Will it be a 1966½ or a 1967? Whatever the answer, it will be the sixth distinct model in the Chevrolet lineup, and it will furnish almost direct competition for the lagging Corvair.

**An all-new Thunderbird** is on the way for 1967. Frame and body structure will be separate. Overall, the car will look much like the current crop of sporty cars with a long, sloping hood, short deck, and a clean expanse of side glass without vent windows. Full-width tail lights will stretch from the extreme edges at both sides. On the two-door model, the side window glass in the rear will slide back into the rearmost roof support instead of rolling down below the belt line. There will also be a four-door model. Front-wheel drive? Not in 1967, but almost certainly by 1968 if the Toronado catches on. All Thunderbirds and Lincolns are built in the same assembly plant (Wixom, Mich.) and that's why Lincoln will also go to a separate frame and body design (but not until 1968). However, if the T-Bird gets front drive, the Lincoln won't necessarily follow suit.

**Front drive for the Riviera?** Buick was offered front drive at the same time Olds decided to build the Toronado, but turned it down. Now reports indicate that Buick is reconsidering, and is thinking about a front-drive Riviera. In fact, *all* GM divisions are said to be seriously thinking of front drive for special models.

**New type of vinyl hardtop:** Vinyl-clad steel is expected to make a big impact on car styling in the next few months. It will cut the cost of vinyl roofs by about 40 percent, and permits the use of vinyl trim on body side panels. The vinyl comes in a range of colors, patterns, and designs. One application soon to make its debut is patterned and colored like wood grain. Steel panels with this vinyl covering will be formed for body parts of Dodge station wagons. Strips of vinyl matching the vinyl tops will be used for side trim on cars in the near future. The vinyl-clad steel is made at the steel mill in sheets, shipped to the auto company where it is pressed into shape in regular body dies. Present vinyl coverings are attached to the car roof by hand *after* the body is assembled, a time-consuming and costly job. With vinyl-clad steel, the vinyl roof that now costs $75 will retail for about $45 extra. Suppliers say that the new material is long-lasting, resistant to fade, and unaffected by road salt.

**"Torsion-bar" seats** may show up on one or more of the specialty cars due next year. This type of seat has been developed by U.S. Steel and consists of a tubular-steel framework with a subframe for the seat cushion suspended by a torsion-bar linkage. The cushion itself can be contour-formed in harder material than present seats because the whole seat bottom is left free to flex.

**Plans to bring out a new Duesenberg** are moving right along. The prototype body is being built in Italy by Ghia, which also will make the production bodies to be shipped to the U. S. for mounting on a custom chassis at Duesenberg's assembly plant in Indianapolis. The company expects to build about 100 of the super-prestige cars in the first year.

Jan P Norbye
Automotive Editor



Urheberrechtlich geschütztes Material

Clark's Team Lotus Formula I Car wins at SPA-Francorchamps, Belgium—sparked by silvery-plated Champions

## Champions use Champions!

**Jim Clark won the '65 World Driver's Championship using Champion spark plugs exclusively. The overwhelming majority of race winners choose Champions because Champions deliver maximum performance. Why settle for less in your car?**

DEPENDABLE CHAMPION SPARK PLUGS

To feel new power, instantly, install new Champions now and every 10,000 miles



Urheberrechtlich geschütztes Material

SMOOTH MELLOW FLAVOR

Blended with flavorful Maple and Old Rum

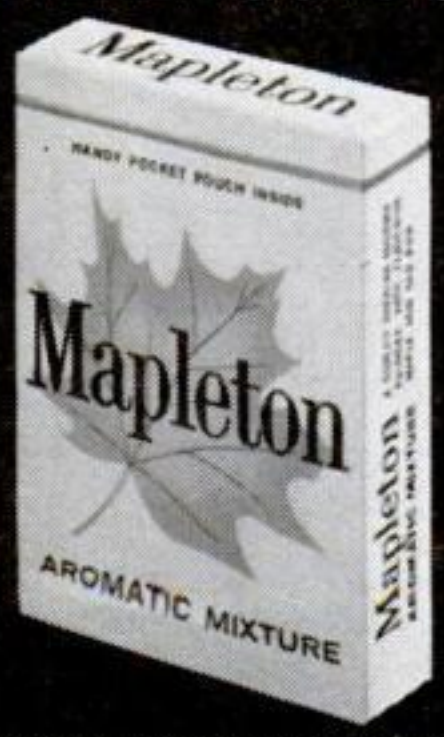
So gentle to your taste

aroma everybody loves

Mapleton

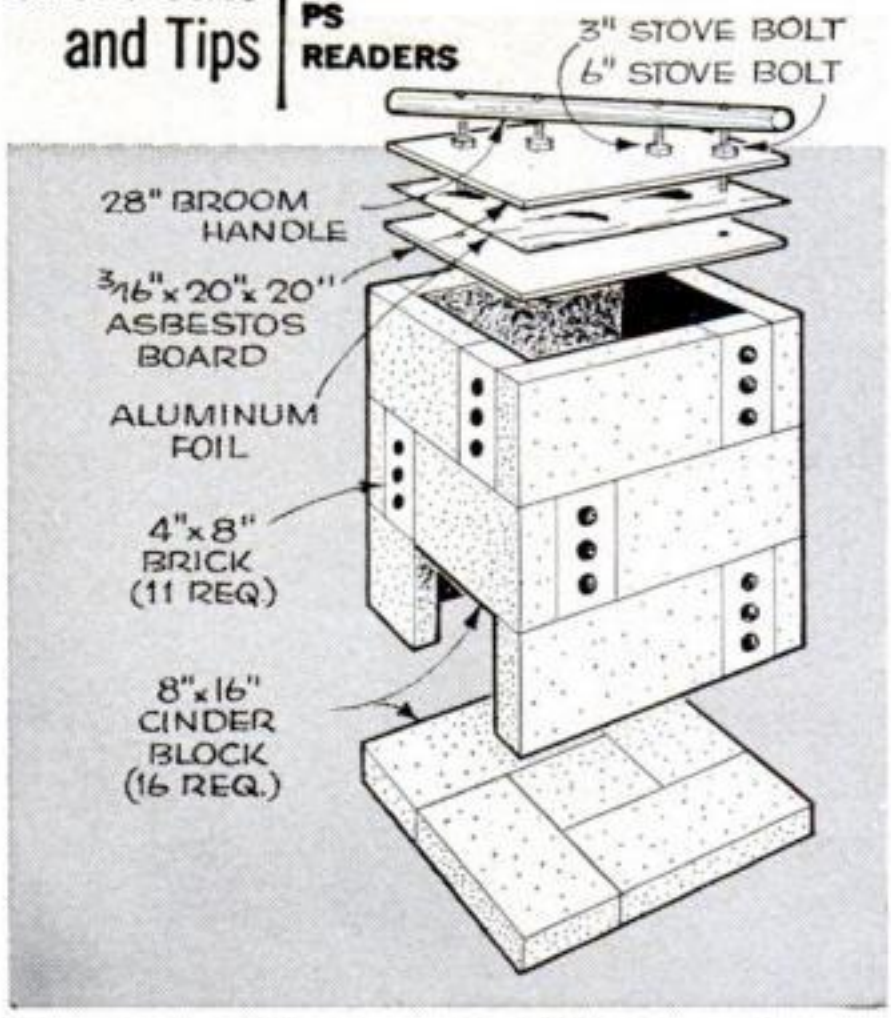
aromatic pipe tobacco

Mixture




UNITED STATES TOBACCO COMPANY

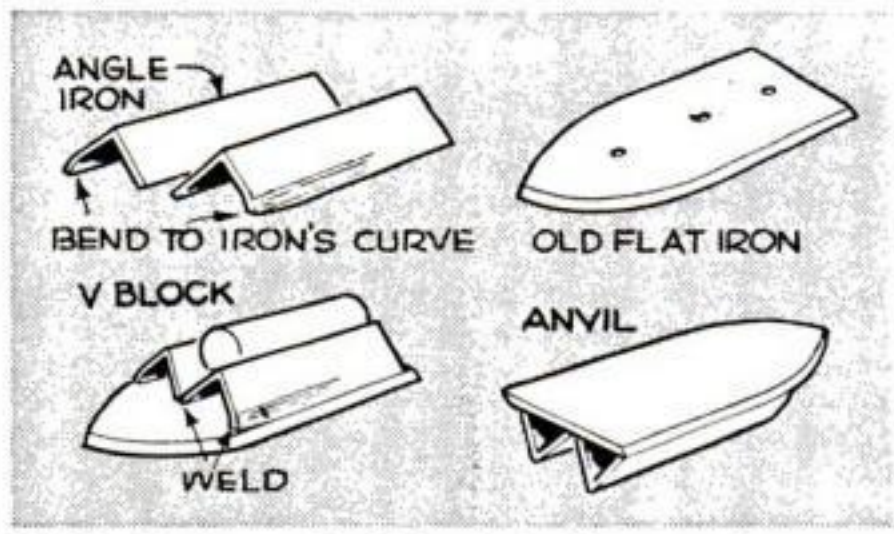
## Short Cuts and Tips FROM PS READERS


3" STOVE BOLT
6" STOVE BOLT
28" BROOM HANDLE
3/16" x 20" x 20" ASBESTOS BOARD
ALUMINUM FOIL
4" x 8" BRICK (11 REQ)
8" x 16" CINDER BLOCK (16 REQ.)

### How to build a household incinerator

Minimum materials and minimum money went into the construction of the household incinerator sketched here. My cost came to less than $5 because I was able to scrounge some of the materials.

The base consists of a 2″ layer of gravel placed in a hole excavated 10″ deep. Cement blocks were then arranged on the gravel as shown. One cinder block was split in half. One part was used to fill in the center of the base; the other piece was used to leave an opening in one side for ash removal. Mortar was mixed from one bag of Sakrete mortar mix.—*Arthur H. Roberts, Indianapolis, Ind.*




### V block does double duty in any shop

Here's a two-in-one tool. Use it as a V block or a small bench anvil. Cut two angle irons three-fourths the length of a flatiron's base. Shape the outer ends to fit the iron's curve. Clamp together and weld to the iron.—*Peter Legon, Malden, Mass.*



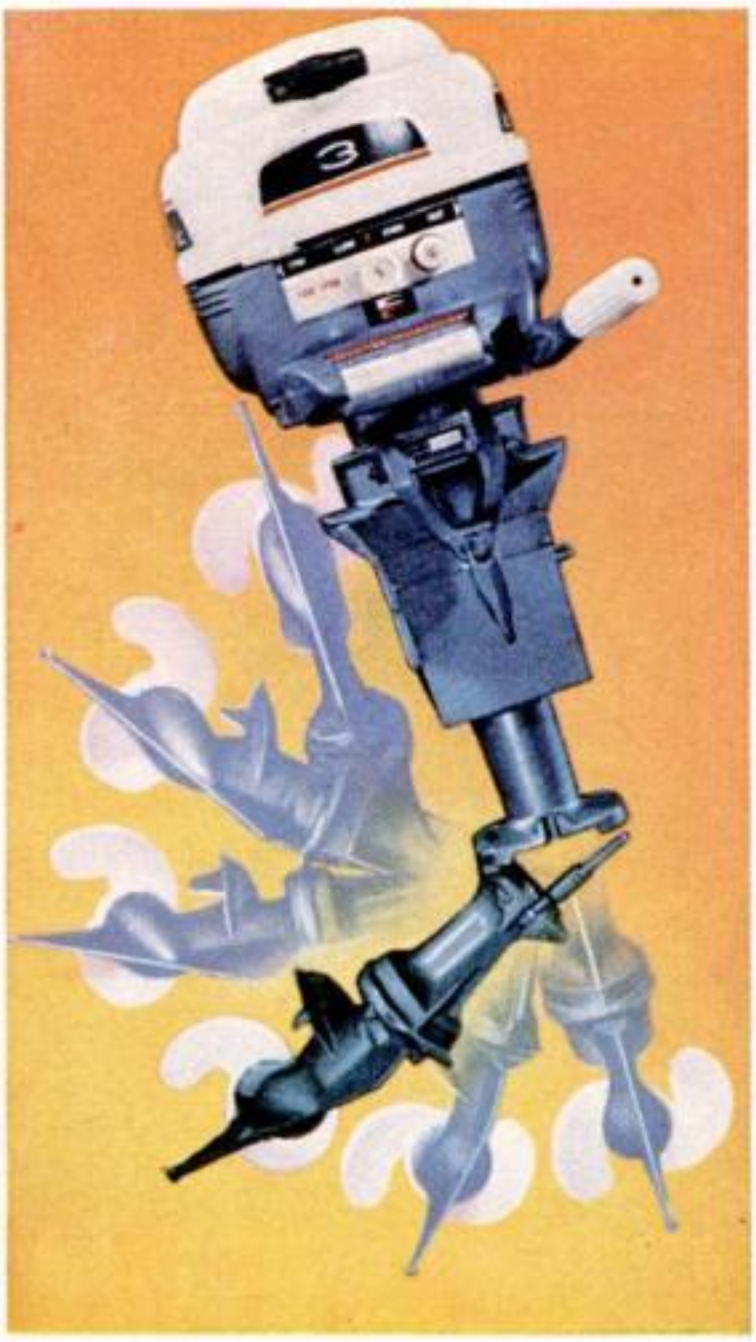
Urheberrechtlich geschütztes Materia

# for 1966 -even the rumors came true.

**RUMOR: "Evinrude has a 'hot' new V-4 outboard."**

**FACT: True.** Newest outboard going is Evinrude's 100 hp STARFLITE 100-S. Same powerhead size as the original "75" — but new combustion engineering and internal exhaust "tuning" squeeze 33% more horsepower out of the same amount of fuel. New ignition. New carburetion. New heat-dissipating pistons. New 2 to 1 gearcase that develops more thrust on big boats — more speed on all boats.

**RUMOR: "Evinrude has a motor that fits in a traveling case."**



**FACT: True.** And the traveling case comes with the motor. New 3-foot, 3 hp Evinrude STOWAWAY folds and stores in a 2-foot plastic carrying case. Goes everywhere — choice of weedless or high thrust drive. Stows anywhere — car trunk, closet, bedroom or basement. Made to order for fishermen, campers — everyone who has ever wanted an outboard but never had room to carry it or a place to keep it.

**RUMOR: "Evinrude has a big new 40 mph Gull Wing boat."**

**FACT: True.** New power options put all 1966 Evinrude boats in the 40 mph class. Big news for 1966 is Evinrude's elegant new 19-foot sports runabout — the ROGUE. A man's boat. Big, brawny, solid, comfortable. For the boating buff who demands the ultimate combination of versatility, performance, seaworthiness, and luxury in a personal sports runabout.

**EVINRUDE**

**first in outboards**

MILWAUKEE, WISCONSIN 53216
DIVISION OF OUTBOARD MARINE CORP

**FREE! Evinrude's new 1966 Boating Preview:**

Like to know more about developments that will be making boating news next year?

Want the latest dope on boats and motors? Long motors, short motors, fishing motors, skiing motors, cruising motors, sailing motors? Motors with push-button controls and motors with controls that run from the top?

Get your personal full-color 32-page preview NOW — by return mail. MAIL THE COUPON TODAY!

**EVINRUDE MOTORS, 4170 N. 27th Street, Milwaukee, Wisconsin 53216**
**Send free 1966 Evinrude Motor and Boat Preview Brochure to:**

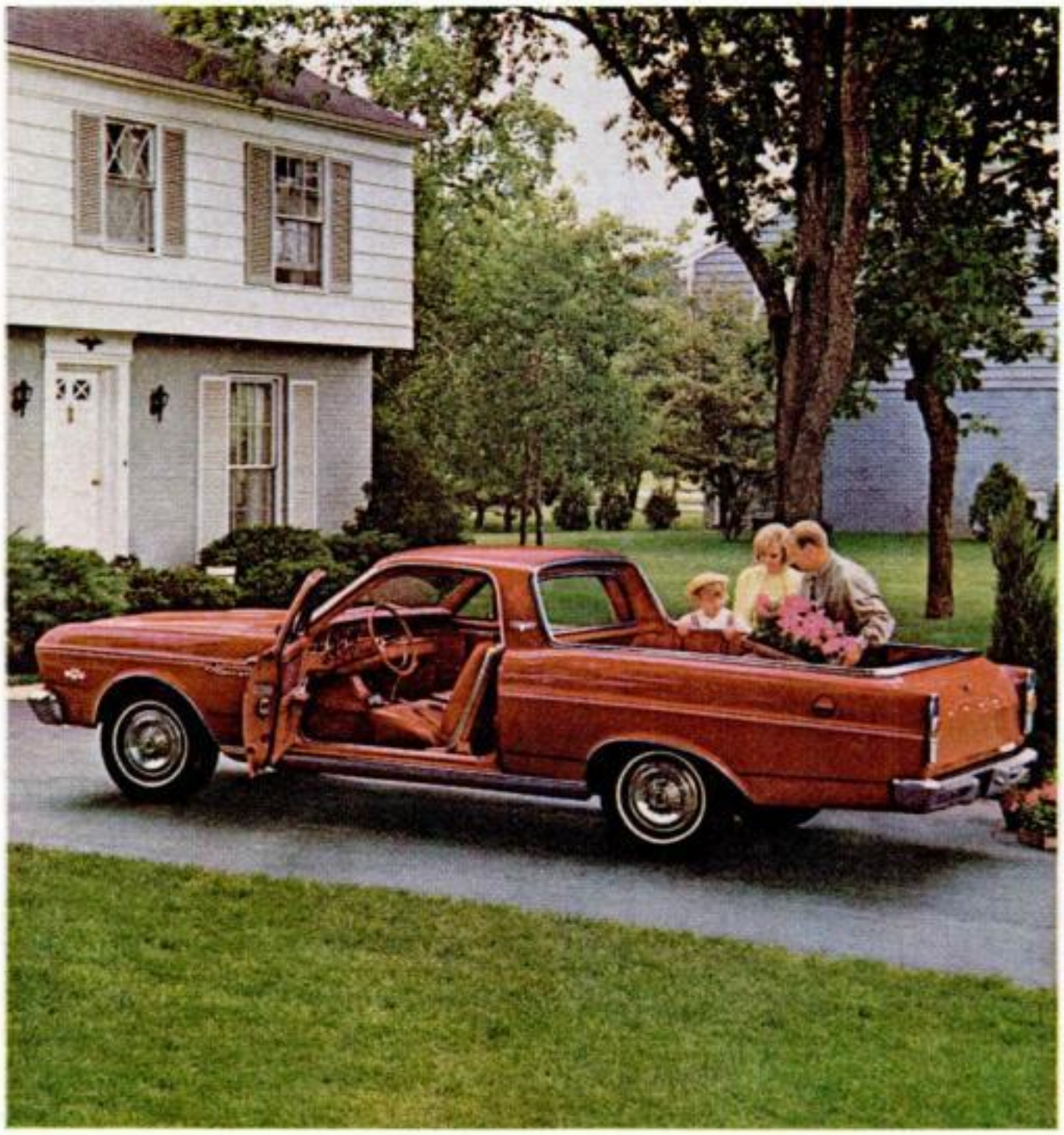
Name.....

Street.....

City.....State.....Zip Code.....

Urheberrechtlich geschütztes Material

# Three new ways to work or play:



## RANCHERO! All-new Luxury!

Even standing still this beauty looks exciting. And no wonder. Those sleek lines cover a high-spirited Ranchero that's new clear through. A longer wheelbase, wider tread and new suspension give you a ride that's wonderfully smooth, soft, and quiet.

Inside, curved side windows, greater width and swept-away dash give a luxurious new feeling of roominess. Bucket seats, center console, wall-to-wall carpeting, air-conditioning — Ranchero offers them all. Any performance combination you want, too — choice of two smooth Sixes, two powerful V-8's. Automatic, 3- or 4-speed stick shift.

Price? That's the only thing about the new Ranchero that isn't big and luxurious.

## STYLESIDE!

Who says a working truck has to ride like one? Not Ford. Nor will you, once you've experienced how Twin-I-Beam suspension in new Ford pickups smooths the road. Each front wheel has its own axle, working independently. Shocks at one wheel aren't passed over to the other. Or to the driver. Steering's surer, too.

Yet, with all Ford's comfort,

Urheberrechtlich geschütztes Material

# starring Ford's all-new Bronco!

## Two-front-axle ride! **BRONCO!** All-new! 4-wheel drive!

you get toughness to spare. Forged axles and radius rods hold wheels in line, lengthen tire life. Big muscle under the hood, too—big V-8 or two Sixes with the smoothness of seven main bearings.

Action-test a '66 Ford Styleside first chance. Whether you use it for work or play, you'll find nothing but pleasure behind the wheel.

Want to get away from it all? Get a Bronco—Ford's new kind of 4-wheel-drive excitement! Takes you over beach sand in summer, through snow in winter. Into woods for hunting. Right up to stream-side for fishing, camping. Up hills that are too steep for roads.

Bronco gives you features never combined before. Frisky six-cylinder power. Clashless shifting into all gears. Smooth coil-spring ride. Lots of ground clearance. Tight 34-foot turning diameter. No annoying whine in 2-wheel drive. Choice of Roadster, Wagon or Sports-Utility.

It all adds up to new fun—for mountain hopping or family shopping. So bust loose in a new Bronco—from your Ford Dealer's corral!

# Ford/66

Urheberrechtlich geschütztes Material

*Great new taste,*
*rich aroma...*
*pipe tobacco does it.*

# Enjoy America's best-tasting pipe tobacco in a filter cigarette!

Urheberrechtlich geschütztes Material

Popular Science
REG U S PAT OFF Monthly

# IT'S NEW-CAR TIME AGAIN:

# The 1966 MODELS

## *New advances • New mistakes*

**Top of the '66s: OLDS TORONADO—a dream car you can buy**

**By Jan P. Norbye**
**Automotive Editor**

EXCLUSIVE PS PHOTOS
BY BILL MORRIS

*The only totally new car, the Toronado will be a trend setter for years to come. Its design is utterly unconventional, with front drive and ultrasafe handling, a low center of gravity, sleek wind-cheating body.*

**Still want to know about rear-drive cars? Turn the page**



Urheberrechtlich geschütztes Material

# *THE SPORTY ONES*

**Almost all the new cars can be made to look sporty—but the best ones were designed as sporty cars from the start**

**FORD MUSTANG** *is the best seller in the group. Small exterior changes identify '66 model: new grille, wheel covers, side scoop ornament, and gas-filler cap.*

**RAMBLER MARLIN** *now has a front stabilizer bar as standard equipment to improve handling; still begs for chassis redesign.*

**BUICK RIVIERA GRAN SPORT** *has all-new body and frame, wider track, longer wheelbase, quick steering, lots of power.*

# *THE LUXURIES* **If a Ford is quieter than a Rolls-Royce,**

**CADILLAC** *adds variable-ratio steering to automatic leveling and other Cadillac exclusives. New improvements in engine assure longer life; horsepower stays at 340.*

**LINCOLN CONTINENTAL** *has a new 462-cu.-in. V-8, new automatic transmission, longer*

**CHEVROLET CORVETTE** *has new high-performance option: A 425-hp., 427-cu.-in. V-8 with Quadra-Jet carb replaces the 375-hp. fuel-injected 327-cu.-in. V-8. Performance is staggering, the steering exquisite, the ride rough but stable.*

**FORD THUNDERBIRD** *is overweight, bad handling, clumsy. Sporty looks and interior luxury can't make up for its poor chassis.*

**PLYMOUTH BARRACUDA** *offers front disk brakes, quick manual steering, heavy-duty springs, wide rims, competition tires.*

## these are so quiet you'll think you're driving a mirage

*springs, better brakes. A two-door hardtop is added; all bodies are fully restyled.*

**IMPERIAL** *gets bigger engine, tilt-and-telescope steering, rear heater, improved seats. But nothing was done about weak spot—brakes are as erratic as last year's.* CONTINUED

# *THE STANDARDS*

**There's nothing substandard about the cars we call standards. If styling changes are small, look at the performance options**

**CHEVROLET IMPALA SS** *offers a 425-hp. Corvette engine, chassis improvements, front and rear stabilizer bars, tighter shock absorbers, wide-rim wheels, larger tires.*

**PONTIAC GRAND PRIX** *comes only as a hardtop coupe and is mechanically unchanged this year, except for better brakes. Fully contoured bucket seats are standard.*



**OLDSMOBILE STARFIRE** *has new bucket seats and a restyled instrument panel with circular dials and optional tachometer.*

**PLYMOUTH SPORT FURY** *rivals VIP sedan for top-of-the-line spot. Both can be had with the Imperial's 440-cu.-in. V-8 and front disks. The Sport Fury has new shell-type bucket seats and improved linkages for both manual and automatic transmissions. Standard springs are softer, and Rally suspension is optional.*

**AMBASSADOR** *disowns Rambler name, adds DPL hardtop option, copying Ford's LTD. Bucking trend, it has no handling kit.*



Urheberrechtlich geschütztes Material

**BUICK WILDCAT** *sports Gran Sport option, with 340-hp. V-8, heavy-duty ride-and-handling kit, quick power-steering gear.*

**FORD GALAXIE** *boasts suspension improvements and optional handling package, optional front disk brakes, and wide choice of engines.*

**CHRYSLER 300** *tries hard to keep sporty image but fails, even with four-barrel 383-cu.-in. V-8 and front disk brakes.*

**MERCURY PARK LANE** *packs 410-cu.-in. V-8, with 428-cu.-in. engine optional, as are Lincoln's front disk brakes.*

CONTINUED



Urheberrechtlich geschütztes Material

# *THE INTERMEDIATES*

**Everybody's working overtime designing in-between cars. Result: an incredible mass of hot and not-so-hot combinations**

**DODGE CORONET** *becomes "muscle car" with Hemi-426 engine, but relies on drum brakes only. Rally suspension makes car remarkably well-balanced and good-handling. The new body retains unit construction.*

**PLYMOUTH SATELLITE** *is top dog of Belvedere series. It shares the mechanical components of Dodge Coronet and, with the best power and handling options, can be one of the speediest mass-production cars.*

JOSEPH FARKAS

**RAMBLER REBEL** *reveals a sudden interest in performance, but even a handling kit fails to overcome obsolete suspension design.*

**CHEVELLE** *is restyled but remains largely unchanged mechanically. Optional: 325-hp. and 360-hp. versions of 396-cu.-in. V-8.*

**FORD FAIRLANE** *is completely new for 1966, with many different characters. The right options—as you pick them—will make the right kind of Fairlane for you. You have a wide choice, including a 335-hp. 390-cu.-in. V-8, new "sportshift" automatic transmission, heavy-duty brakes and suspension, and wide-rim wheels.*

**BUICK SKYLARK GRAN SPORT** *has a handling package; lacks rear stabilizer bar, quick-steering option. Power: 325-hp. 401 V-8.*

**PONTIAC TEMPEST SPRINT SIX** *has new 207-hp. single-OHC engine, readily tops 100, handles with precision.* CONTINUED

# *THE COMPACTS*

**The new generation offers roomy interiors, and all but one have V-8 options**

**RAMBLER AMERICAN** *gets new base engine—a 128-hp. six; option is a 155-hp. six. Handling package has only HD shocks and stabilizer.*

**FORD FALCON** *has an all-new body, redesigned front suspension, longer wheelbase, wider track. The new styling borrows from Mustang—long hood, short deck. The Futura Sports Coupe comes with a 200-hp. V-8, manual or automatic transmission.*

**PLYMOUTH VALIANT** *has minor modifications: The transmission is simplified, consoles are new, power steering is improved, drum brakes are better, and front disk brakes are optional.*

**CHEVY II** *gets a new look and more power options. If your garage is too small for the 360-hp. Chevelle, try the 350-hp. Chevy II. Suspension systems are mated to the power trains.*



Urheberrechtlich geschütztes Material

## Model Availability —1966 vs. 1965

| | | 1966 | 1965 |
|---|---|---|---|
| FORD | Falcon | 10 | 13 |
| | Mustang | 3 | 3 |
| | Fairlane | 13 | 8 |
| | Ford | 19 | 17 |
| | Thunderbird | 4 | 3 |
| | Comet | 15 | 11 |
| | Mercury | 21 | 21 |
| | Lincoln | 3 | 2 |
| | Total Ford | 88 | 78 |
| CHRYSLER | Valiant | 14 | 18 |
| | Barracuda | 1 | 1 |
| | Dodge Dart | 10 | 9 |
| | Belvedere | 18 | 18 |
| | Coronet | 13 | 17 |
| | Plymouth | 23 | 22 |
| | Dodge | 12 | 13 |
| | Chrysler | 13 | 17 |
| | Imperial | 4 | 4 |
| | Total Chrysler | 108 | 119 |
| GENERAL MOTORS | Corvair | 7 | 7 |
| | Chevy II | 7 | 7 |
| | Chevelle | 12 | 12 |
| | Chevrolet | 19 | 15 |
| | Corvette | 2 | 2 |
| | Tempest | 16 | 12 |
| | Pontiac | 17 | 14 |
| | F-85 | 21 | 13 |
| | Oldsmobile | 17 | 19 |
| | Toronado | 2 | 0 |
| | Buick Special | 29 | 14 |
| | Buick | 24 | 24 |
| | Riviera | 1 | 1 |
| | Cadillac | 12 | 11 |
| | Total GM | 186 | 151 |
| AMC | American | 9 | 10 |
| | Classic | 8 | 11 |
| | Marlin | 1 | 1 |
| | Ambassador | 8 | 8 |
| | Total AMC | 26 | 30 |
| | Grand Total | 408 | 378 |

# Custom-Build Your Car on the Order Form

*You write the specifications and Detroit will build the car. This year, you have a choice of more models, more body styles, and more power-train and chassis options than ever before. By using the following 18 pages, you can become an armchair engineer and pick the parts you want for your own tailor-made car*

**By Jan P. Norbye** Automotive Editor
**Exclusive Photos by Bill Morris**

## How Car Buying Has Changed in 20 Years

While several manufacturers have dropped out in the past 20 years, the number of models has grown rapidly. This chart shows the rise of the station wagon, the emergence of the hardtop, the demise of the two-door sedan, and the boom in convertibles. Charts on the following pages give details on chassis options.

| | 1966 | 1956 | 1946 |
|---|---|---|---|
| 4-door sedan | 84 | 60 | 56 |
| 2-door sedan (coupe) | 53 | 28 | 77 |
| 4-door hardtop | 36 | 28 | 0 |
| 2-door hardtop | 89 | 52 | 0 |
| Convertible | 64 | 24 | 20 |
| Station wagon | 82 | 40 | 7 |
| Total | 408 | 232 | 160 |

Urheberrechtlich geschütztes Material

# At FORD MOTOR
# Brakes and Power Get a Boost

**Among the highlights: a Falcon Futura Sports Coupe, a Comet Cyclone GT, a 7-Litre Ford with front disks, a restyled Continental**

NEW engines include a civilized 428-cu.-in. V-8 based on the 427 of the stock-car racers, a 410 for Mercury, and a 462 for Lincoln. The Falcon convertible is discontinued. Continental adds a hardtop. Fairlane GT/A has a new "sport-shift."

***MUSTANG*** continues practically unchanged. Three models are available: hardtop, fastback coupe, and convertible. The GT equipment group is worth looking at. It includes front disk brakes, a special handling package, and a dual exhaust system. Need more? See Carroll Shelby about a Mustang GT 350.

***FALCON*** has a completely new look for '66. Inside, there's more leg room and head room, seats are wider, door openings are higher, doors swing wider. The trunk is larger. The accelerator is suspended (as on the big Fords last year), and a padded dash is mated to a pleasant instrument panel with round dials. There are proper gauges for water temperature and fuel, but warning lights only for amps and oil pressure.

Wheelbase is up from 109.4 to 110.9



Urheberrechtlich geschütztes Material

**Now standard** on all Mustangs are 14-inch wheels (1965 sixes had 13-inch rims). GT instrument panel with five dials replaces sweep-type speedometer, oil and amp warning lights.

## '66 MUSTANG OPTIONS

| Engine | 200 Six | | | 289 V-8 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Compression | 9.2 | | | 9.3 | | | 10.0 | | | 10.5 | |
| Carburetor | 1-bbl. | | | 2-bbl. | | | 4-bbl. | | | 4-bbl. | |
| Power @ r.p.m. | 120 @ 4,400 | | | 200 @ 4,400 | | | 225 @ 4,800 | | | 271 @ 6,000 | |
| Transmission | 3 | 4 | Auto. | 3 | 4 | Auto. | 3 | 4 | Auto. | 4 | |
| Axle ratio | 3.20 | 2.83 | | 2.80 | | | 3.00 | | | 3.50 | |
| Non-slip diff. | Opt. | | | Opt. | | | Opt. | | | Opt. | |
| Disk brakes | No | | | Opt. | | | Opt. | | | Opt. | |
| Power brakes | Opt. | | | Opt. | | | Opt. | | | Opt. | |
| Power steering | Opt. | | | Opt. | | | Opt. | | | Opt. | |
| Quick steering | No | | | Opt. | | | Opt. | | | Opt. | |
| Handling kit | Opt. | | | Opt. | | | Opt. | | | Opt. | |
| Bigger wheels | No | | | No | | | No | | | No | |

inches, and the whole car is 2.7 inches longer (184.3), but only slightly heavier. Overall height is unchanged.

This year, for the first time, the Falcon is available with power brakes. The vacuum booster reduces pedal effort by 55 percent and cuts pedal travel to speed up braking response. Also for the first time, the Falcon has a foot-operated parking brake.

Falcon has discontinued its convertible, its two-door hardtop (but brought out a Futura Sports Coupe in its place), and two station-wagon models—the two-door wagon and the Squire.

The new Falcon wagons are 14.4 inches longer than last year's 198.7 inches, and wheelbase is stretched to 113 inches.

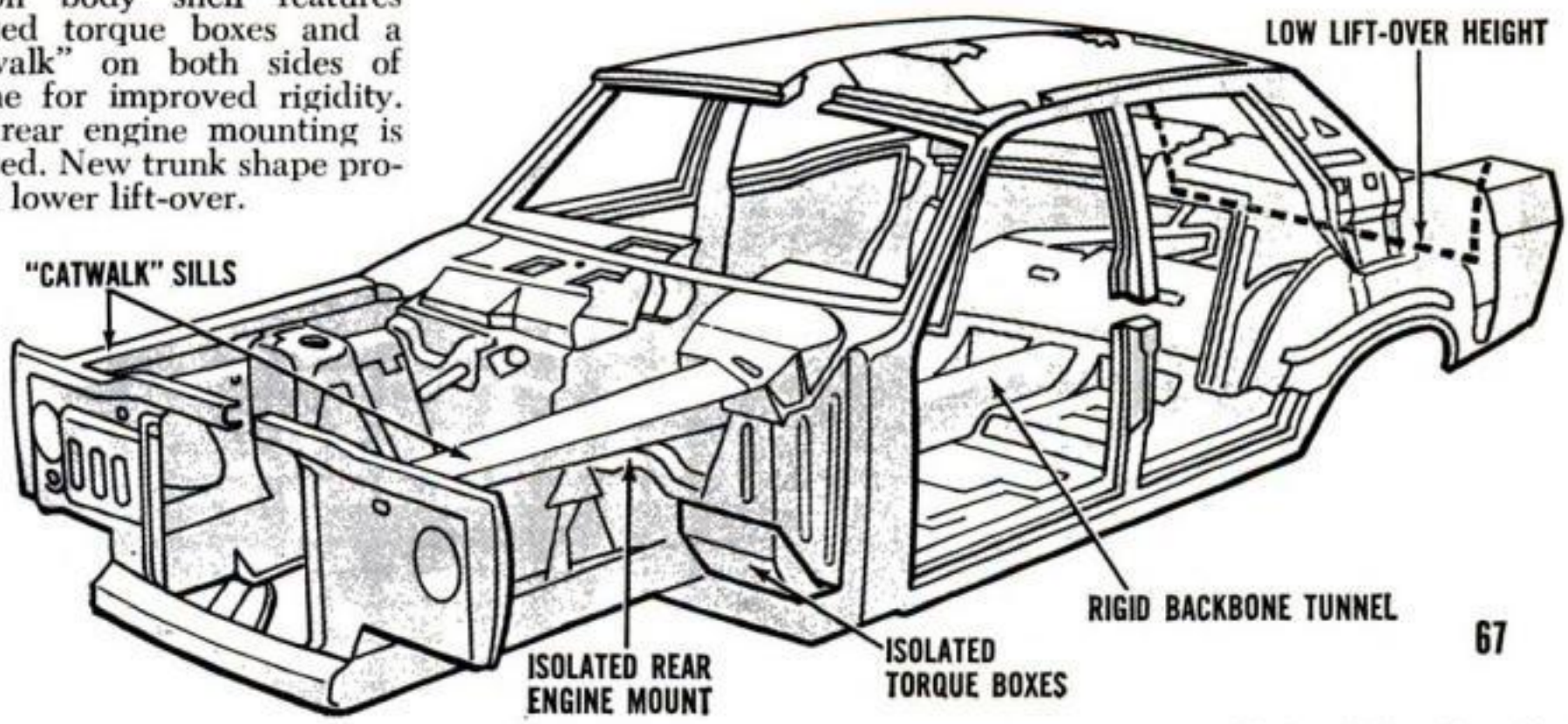
CONTINUED

**Falcon track** is up from 55.6 inches in front and 56 rear to 58 all around. Redesigned front suspension has raised the roll center, and new rear springs are longer and wider. Car's stability is much improved; the ride is also better.

## '66 FALCON OPTIONS

| Engine | 170 Six | | 200 Six | | 289 V-8 | | |
|---|---|---|---|---|---|---|---|
| Compression | 9.1 | | 9.2 | | 9.3 | | |
| Carburetor | 1-bbl. | | 1-bbl. | | 2-bbl. | | |
| Power @ r.p.m. | 105 @ 4,400 | | 120 @ 4,400 | | 200 @ 4,400 | | |
| Transmission | 3 | Auto. | 3 | Auto. | 3 | 4 | Auto. |
| Axle ratio | 3.20 | 2.83 | 3.20 | 2.83 | 2.80 | | |
| Non-slip diff. | Opt. | | Opt. | | Opt. | | |
| Disk brakes | No | | No | | No | | |
| Power brakes | Opt. | | Opt. | | Opt. | | |
| Power steering | Opt. | | Opt. | | Opt. | | |
| Quick steering | No | | No | | No | | |
| Handling kit | No | | No | | No | | |
| Bigger wheels | No | | No | | Std. | | |

**New integral-construction** Falcon body shell features isolated torque boxes and a "catwalk" on both sides of engine for improved rigidity. The rear engine mounting is isolated. New trunk shape provides lower lift-over.






Urheberrechtlich geschütztes Material

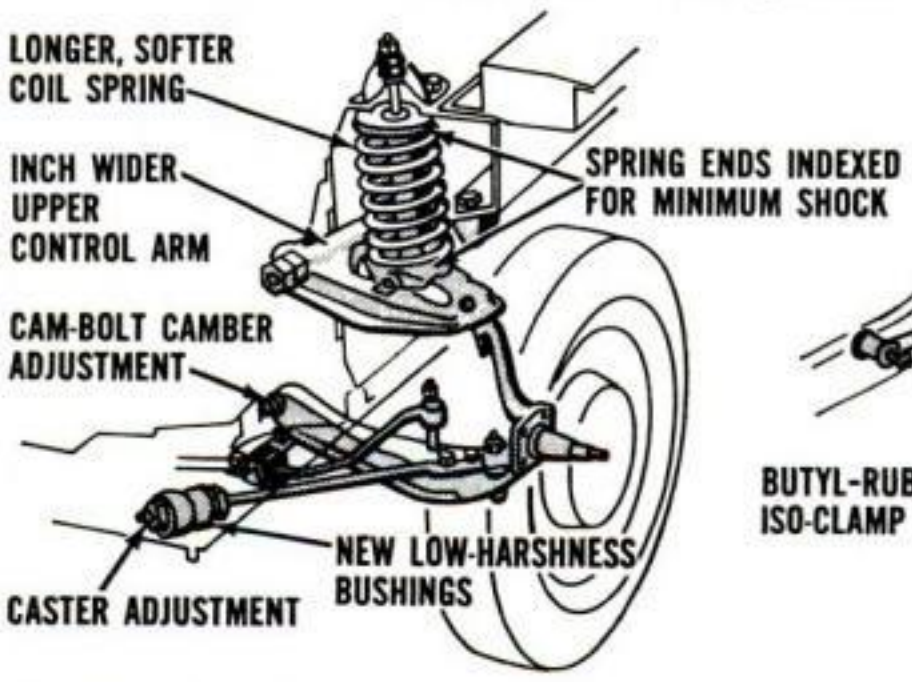
**Ford Fairlane** is redesigned and re-engineered but remains conventional in its concept. The track is wider, and while the standard springs are softer, a handling package is optional.

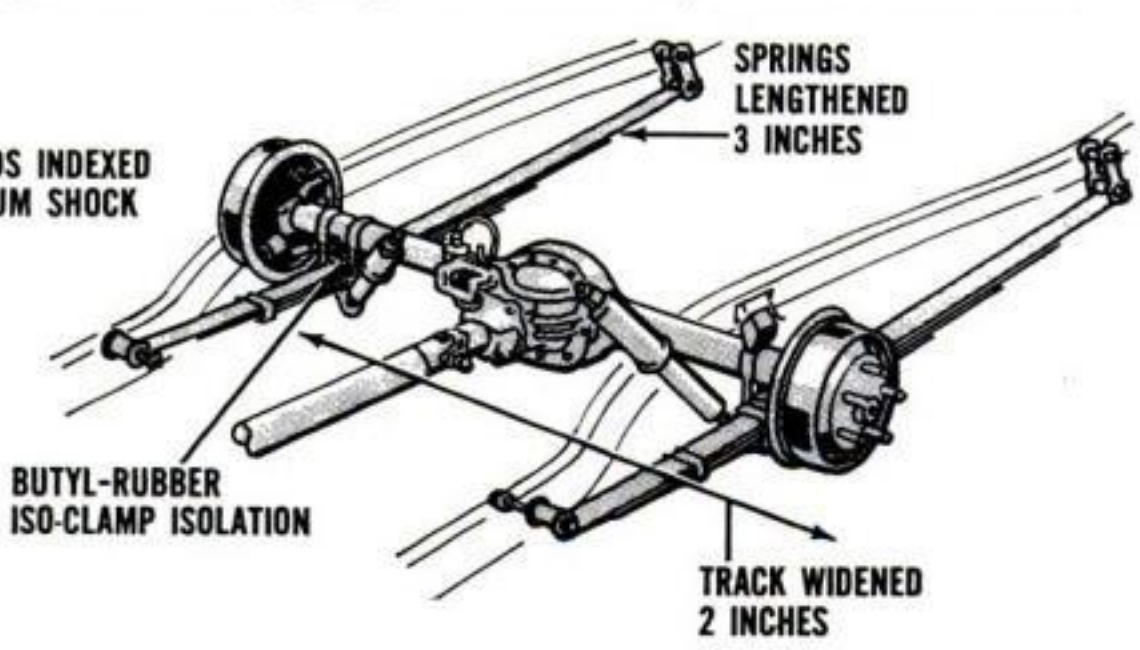
**'66 FAIRLANE OPTIONS**

| Engine | 200 Six | | 289 V-8 | | | 390 V-8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Compression | 9.2 | | 9.3 | | | 9.5 | | | 10.5 | |
| Carburetor | 1-bbl. | | 2-bbl. | | | 2-bbl. | | | 4-bbl. | |
| Power @ r.p.m. | 120 @ 4,400 | | 200 @ 4,400 | | | 265 @ 4,400 | | 275 @ 4,400 | 335 @ 4,800 | |
| Transmission | 3 | Auto. | 3 | 4 | Auto. | 3 | 4 | Auto. | 3 | 4 | Auto. |
| Axle ratio | 3.25 | 2.80 | 2.80 | 3.25 | 2.80 | 3.00 | | | 3.00 | |
| Non-slip diff. | Opt. | | Opt. | | | Opt. | | | Opt. | |
| Disk brakes | No | | No | | | No | | | No | |
| Power brakes | Opt. | | Opt. | | | Opt. | | | Opt. | |
| HD brakes | Opt. | | Opt. | | | Opt. | | | Std. | |
| Power steering | Opt. | | Opt. | | | Opt. | | | Opt. | |
| Quick steering | No | | No | | | No | | | No | |
| Handling kit | Opt. | | Opt. | | | Opt. | | | Std. | |
| Bigger wheels | No | | No | | | No | | | No | |

**FAIRLANE** will be remembered as one of the most changed cars of 1966. The integral body-and-frame structure is new, the suspension system has been redesigned, and the transmissions have been improved. The new springs are softer, but heavy-duty suspension is optional. In my opinion, it's needed. With manual transmission, the Fairlane has a new semi-centrifugal clutch, in which weighted levers raise plate pressure as r.p.m. go up. Star of the Fairlane range is the GT/A, with a 335-hp. V-8 and a new "sportshift" automatic transmission, which offers the driver better control over his up- and down-shifts. Four-on-the-floor is available with the V-8 engines; the sixes come with manual or automatic three-speeds.

**COMET** is really two different cars this year—a short 202 and a long Capri/Caliente/Cyclone. All have the same 116-inch wheelbase and underbody, but the skin differs considerably. The track is now 58 inches all around (in 1965 it was 55 in front and 56 at the rear). If you want manual steering, the ratio is higher and response slower—at a time when most factories are going the other way. More than 100






Urheberrechtlich geschütztes Material

**Mercury S-55** is a new sports model. This one has a 345-hp. V-8, round instruments, all-synchromesh floor shift.

**'66 COMET OPTIONS**

| Engine | 200 Six | | 289 V-8 | | | 390 V-8 | | | | 390 V-8 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Compression | 9.2 | | 9.3 | | | 9.5 | | | | 10.5 | |
| Carburetor | 1-bbl. | | 2-bbl. | | | 2-bbl. | | | | 4-bbl. | |
| Power @ r.p.m. | 120 @ 4,400 | | 200 @ 4,400 | | | 265 @ 4,400 | | 275 @ 4,400 | | 335 @ 4,800 | |
| Transmission | 3 | Auto. | 3 | 4 | Auto. | 3 | 4 | Auto. | | 3 | 4 | Auto. |
| Axle ratio | 3.25 | 2.80 | 2.80 | 3.25 | 2.80 | 3.00 | | | | 3.00 | |
| Non-slip diff. | Opt. | | Opt. | | | Opt. | | | | Opt. | |
| Disk brakes | No | | No | | | No | | | | No | |
| Power brakes | Opt. | | Opt. | | | Opt. | | | | Opt. | |
| HD brakes | Opt. | | Opt. | | | Opt. | | | | Std. | |
| Power steering | Opt. | | Opt. | | | Opt. | | | | Opt. | |
| Quick steering | No | | No | | | No | | | | No | |
| Handling kit | Opt. | | Opt. | | | Opt. | | | | Opt. | |
| Bigger wheels | No | | No | | | No | | | | No | |

pounds was added to the body structure to improve strength and isolation—was that necessary? Even if it was, I doubt whether the standard springs also had to be made softer. The result gives a good boulevard ride but mushy behavior on bad roads and sloppy cornering. Luckily, there's a handling package. The new sports model, Cyclone GT, is available with XPL floor-shift automatic or three- or four-speed manual shifts.

**MERCURY** has revised rear suspension for improved handling, softer front springs, optional front disk brakes, and some new engines. A special heavy-duty XPL Merc-O-Matic has been developed for the big V-8s. It's lighter, sturdier, and quieter. After a spell in the latest Mercury, I feel that, like the smaller Comet, the Mercury needs a handling package. Unlike the Comet, none is available.

**'66 MERCURY OPTIONS**

| Engine | 390 V-8 | | | 410 V-8 | 428 V-8 |
|---|---|---|---|---|---|
| Compression | 9.5 | | | 10.5 | 10.5 |
| Carburetor | 2-bbl. | | | 4-bbl. | 4-bbl. |
| Power @ r.p.m. | 265 @ 4,400 | | 275 @ 4,400 | 330 @ 4,600 | 345 @ 4,600 |
| Transmission | 3 | Auto. | 3 Auto. | 3 \| 4 \| Auto. | 4 \| Auto. |
| Axle ratio, std. | 3.00 | | | 2.80 | 3.00 |
| Axle ratio, opt. | 3.25 | | | 3.50 | 3.50 |
| Non-slip diff. | Opt. | | | Opt. | Opt. |
| Disk brakes | Opt. | | | Opt. | Opt. |
| Power brakes | Opt. | | | Opt. | Opt. |
| Power steering | Opt. | | | Opt. | Opt. |
| Quick steering | No | | | No | No |
| Handling kit | No | | | No | No |
| Bigger wheels | No | | | No | No |

**Mercury Comet** shares basic structure with Ford's Fairlane, has bigger brakes and a host of engine options. Springs are softer, and manual-steering ratio has been raised to lower effort.

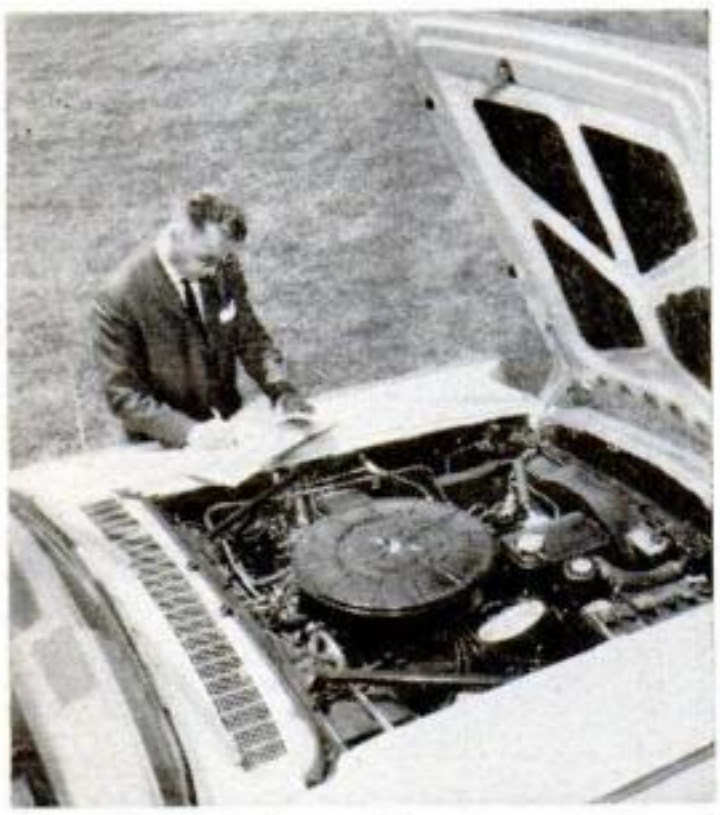
CONTINUED



Urheberrechtlich geschütztes Material

**Ford and Mercury** station wagons have tailgates that can be opened two ways: folded down flush with the floor or swung open like a door. Separate handles control the locks, which interlock to prevent tailgates coming off.

**Ranchero,** restyled, shares basic Falcon body. This sporty model has a 200-hp. V-8, bucket seats, four-on-the-floor—but all Falcon power-train options apply. Load area is increased, and gains in interior space are remarkable.



**Lincoln Continental's** new engine is a 462-cu.-in. V-8 enlarged from the 1961-65 430-cu.-in. unit. The transmission is all new, and chassis modifications include longer rear leaf springs and front suspension refinements. For '66, Lincoln is coming out with a new model: a two-door hardtop.

## '66 FORD OPTIONS

| Engine | 240 Six | 289 V-8 | 352 V-8 | 390 V-8 | | 428 V-8 | 427 V-8 | |
|---|---|---|---|---|---|---|---|---|
| Compression | 9.2 | 9.3 | 9.3 | 9.5 | 10.5 | 10.5 | 11.1 | 11.1 |
| Carburetor | 1-bbl. | 2-bbl. | 4-bbl. | 2-bbl. | 4-bbl. | 4-bbl. | 4-bbl. | 2 4-bbl. |
| Power @ r.p.m. | 155 @ 4,200 | 200 @ 4,400 | 250 @ 4,400 | 265 @ 4,000 | 335 @ 4,600 | 345 @ 4,600 | 410 @ 5,600 | 425 @ 6,000 |
| Transmission | 3 \| Auto. | 3 \| Auto. | Auto. | Auto. | 3 \| 4 \| Auto. | 4 \| Auto. | 4 | |
| Axle ratio | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.25 | |
| Non-slip diff. | Opt. | Opt. | Opt. | Opt. | Opt. | Opt. | No | |
| Disk brakes | Opt. | Opt. | Opt. | Opt. | Opt. | Opt. | Opt. | |
| Power brakes | Opt. | Opt. | Opt. | Opt. | Opt. | Opt. | Opt. | |
| Power steering | Opt. | Opt. | Opt. | Opt. | Opt. | Opt. | No | |
| Quick steering | No | No | No | No | No | No | No | |
| Handling kit | No | No | No | No | No | Opt. | Std. | |
| Bigger wheels | No | No | No | No | No | No | No | |

**FORD** gives you a choice of eight engines in '66 (against five last year). They range from the 240 six to a new 428 V-8—a street version of the competition-type 427 V-8. The handling package is standard with the 427 engine and optional with the 428. The standard suspension has lower front spring rates and revalved shock absorbers, and the rear track-bar mounting point has been lowered for a better-balanced ride. Front disk brakes are optional across the board (and standard on the new 7-Litre series—a prestige model with the 428 V-8 engine, plus special paint and ornamentation).

**CONTINENTAL** has a new engine with larger bore and stroke; a new intake manifold with higher gas velocity; new cylinder heads with larger ports; new, larger intake valves; new camshaft with higher lift and revised lobes; new crankshaft; new, lighter pistons with smaller quench area; improved engine mounts. The new, lightweight C-6 automatic transmission is a smoother-shifting three-speed dual-range unit.

Urheberrechtlich geschütztes Material

# At CHRYSLER CORPORATION Middle Cars Are the Stars

## Chrysler bets on the intermediates while the low lines and main lines are basically unchanged

**DART** continues in the same size and shape, with many mechanical improvements: A cross-and-roller universal joint with sliding splines on the transmission output shaft reduces vibration. The V-8 engine has a tougher clutch with 20-per-cent higher spring load. A new power-steering pump gives more boost at low engine speed, less boost at high r.p.m. for better road feel on the highway, easier parking. There are new transmission linkages and more durable brake linings.

**VALIANT** is redecorated rather than restyled (although there are sheet-metal changes in the roof line and deck). Mechanically, it shares many of the Dart's refinements: improved power steering, thicker brake linings, new driveshaft universal joints. A convertible continues in the Signet series.

**BARRACUDA** is available as a two-door fastback only. There is a lot of performance equipment for it, such as front disk brakes with or without power assist, quick manual steering, and the Formula S package (handling kit, tachometer, wide-rim wheels, competition tires, and the Commando 273-cu.-in. V-8 with four-barrel carburetor). An oil-pressure gauge is standard.

CONTINUED

**Dodge Dart** is available with a 235-hp. V-8, front disk brakes, and heavy-duty suspension.

### '66 DART OPTIONS

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Engine | 170 Six | | | 225 Six | | | 273 V-8 | | | | | | | | |
| Compression | 8.5 | | | 8.4 | | | 8.8 | | | | 10.5 | | | | |
| Carburetor | 1-bbl. | | | 1-bbl. | | | 2-bbl. | | | | 4-bbl. | | | | |
| Power @ r.p.m. | 101 @ 4,400 | | | 145 @ 4,000 | | | 180 @ 4,200 | | | | 235 @ 5,200 | | | | |
| Transmission | 3 | Auto. | | 3 | 4 | Auto. | 3 | 4 | Auto. | | 3 | 4 | Auto | | |
| Axle ratio, std. | 3.23 | | | 3.23 | | 2.93 | 2.93 | | | | | | | | |
| Axle ratio, opt. | No | | | No | | | 3.23/3.55 | | | | | | | | |
| Non-slip diff. | Opt. | | | Opt. | | | Opt. | | | | | | | | |
| Disk brakes | Opt. | | | Opt. | | | Opt. | | | | | | | | |
| Power brakes | Opt. | | | Opt. | | | Opt. | | | | | | | | |
| Power steering | Opt. | | | Opt. | | | Opt. | | | | | | | | |
| Quick steering | No | | | No | | | No | | | | | | | | |
| Handling kit | Opt. | | | Opt. | | | Opt. | | | | | | | | |
| Bigger wheels | Opt. | | | Opt. | | | Opt. | | | | | | | | |

### '66 VALIANT AND BARRACUDA OPTIONS

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Engine | 170 Six | | | 225 Six | | | 273 V-8 | | | | | | | | |
| Compression | 8.5 | | | 8.4 | | | 8.3 | | | | 10.5 | | | | |
| Carburetor | 1-bbl. | | | 1-bbl. | | | 2-bbl. | | | | 4-bbl. | | | | |
| Power @ r.p.m. | 101 @ 4,400 | | | 145 @ 4,000 | | | 180 @ 4,200 | | | | 235 @ 5,200 | | | | |
| Transmission | 3 | Auto. | | 3 | | Auto. | 3 | 4 | Auto. | | 3.23 | | | | |
| Axle ratio, std. | 3.23 | | | 3.23 | | 2.93 | 3.23 | 2.93 | 2.93 | | 3.23 | | 2.93 | | |
| Axle ratio, opt. | No | | | No | | | No | | | | 3.55 | | No | | |
| Non-slip diff. | Opt. | | | Opt. | | | Opt. | | | | Opt. | | | | |
| Disk brakes | Opt. | | | Opt. | | | Opt. | | | | Opt. | | | | |
| Power brakes | Opt. | | | Opt. | | | Opt. | | | | Opt. | | | | |
| Power steering | Opt. | | | Opt. | | | Opt. | | | | Opt. | | | | |
| Quick steering | No | | | No | | | Opt. | | | | Opt. | | | | |
| Handling kit | Opt. | | | Opt. | | | Opt. | | | | Opt. | | | | |
| Bigger wheels | Opt. | | | Opt. | | | Opt. | | | | Opt. | | | | |

**Plymouth Valiant** has all the power-train and chassis options of the Barracuda, but even the old 225 six makes it a very lively compact.

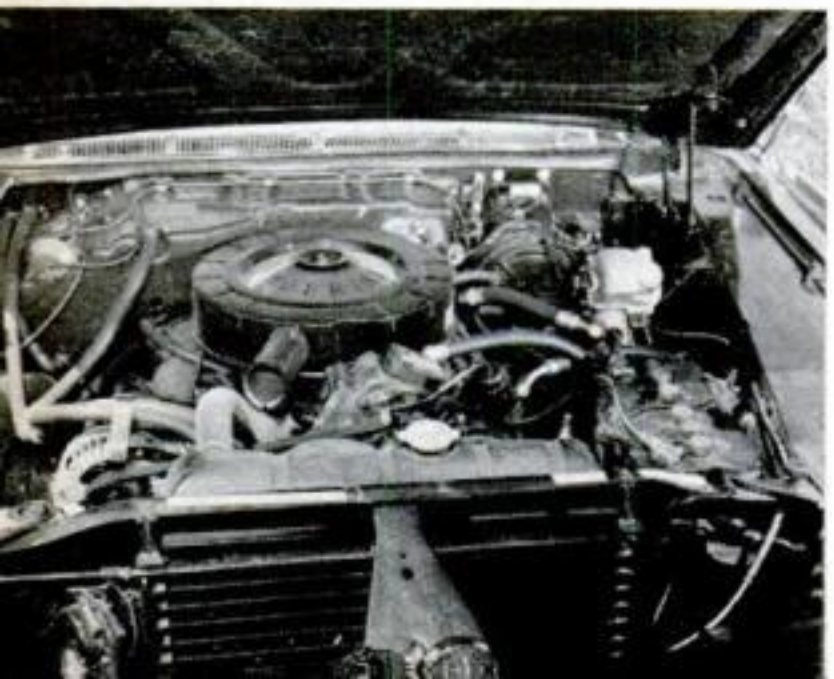
**Plymouth Barracuda** has an optional Formula S package, which transforms the car from just a fastback Valiant into a Grand Touring car.

**Plymouth Belvedere** is one of Chrysler's two stars for '66, with revamped skin and interiors, some new engines and improved transmission linkages, bigger brakes (but no disks yet!), shell-type bucket seats, optional rally springs.

## '66 PLYMOUTH BELVEDERE OPTIONS

| Engine | 225 Six | | 273 V-8 | | 318 V-8 | | 361 V-8 | | 383 V-8 | | 426 V-8 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Compression | 8.4 | | 8.8 | | 9.0 | | 9.0 | | 10.0 | | 10.25 | |
| Carburetor | 1-bbl. | | 2-bbl. | | 2-bbl. | | 2-bbl. | | 4-bbl. | | 2 4-bbl. | |
| Power @ r.p.m. | 145 @ 4,400 | | 180 @ 4,200 | | 230 @ 4,400 | | 265 @ 4,400 | | 325 @ 4,800 | | 425 @ 5,000 | |
| Transmission | 3 | Auto. | 3 | Auto. | 3 | Auto. | 4 | Auto. | 4 | Auto. | 4 | Auto. |
| Axle ratio | 3.23 | 2.93 | 3.23 | 2.94 | 3.23 | 2.94 | 3.23 | | 3.23 | | 3.23 | |
| Non-slip diff. | Opt. | | Opt. | | Opt. | | Opt. | | Opt. | | Opt. | |
| Disk brakes | No | | No | | No | | No | | No | | No | |
| Power brakes | Opt. | | Opt. | | Opt. | | Opt. | | Opt. | | Opt. | |
| HD brakes | Spl. order | | Spl. order | | Spl. order | | Spl. order | | Spl. order | | Spl. order | |
| Power steering | Opt. | | Opt. | | Opt. | | Opt. | | Opt. | | Opt. | |
| Quick steering | No | | No | | No | | No | | No | | No | |
| Handling kit | Opt. | | Opt. | | Opt. | | Opt. | | Opt. | | Opt. | |
| Bigger wheels | Opt. | | Opt. | | Opt. | | Opt. | | Opt. | | Opt. | |

**Imperial** has a 440-cu.-in. V-8 bored out from last year's 413. The big limousine has excellent performance, good ride comfort, and high directional stability—but poor brakes.



***BELVEDERE*** is built on a 116-inch wheelbase with suspension systems carried over from '65. Rally suspension is optional with all Plymouths, but even in standard form the Belvedere has acceptable handling.

***IMPERIAL*** has many new luxury features and vastly improved seating. Power accessories show up everywhere—in addition to the starter motor, a typical Imperial has 15 elec-

## '66 CHRYSLER OPTIONS

| Engine | 383 V-8 | | 383 V-8 | 440 V-8 |
|---|---|---|---|---|
| Compression | 9.2 | | 10.0 | 10.1 |
| Carburetor | 2-bbl. | | 4-bbl. | 4-bbl. |
| Power @ r.p.m. | 270 @ 4,400 | | 325 @ 4,800 | 365 @ 4,600 |
| Transmission | 3 | Auto. | Auto. | Auto. |
| Axle ratio, std. | 3.23 | 3.23 | 2.76 | 2.76 |
| Axle ratio, opt. | No | | 3.23 | 3.23 |
| Non-slip diff. | Opt. | | Opt. | Opt. |
| Disk brakes | Opt. | | Opt. | Opt. |
| Power brakes | Opt. | | Opt. | Opt. |
| Power steering | Opt. | | Opt. | Opt. |
| Quick steering | No | | No | No |
| Handling kit | Opt. | | Opt. | Opt. |
| Bigger wheels | Opt. | | Opt. | Opt. |

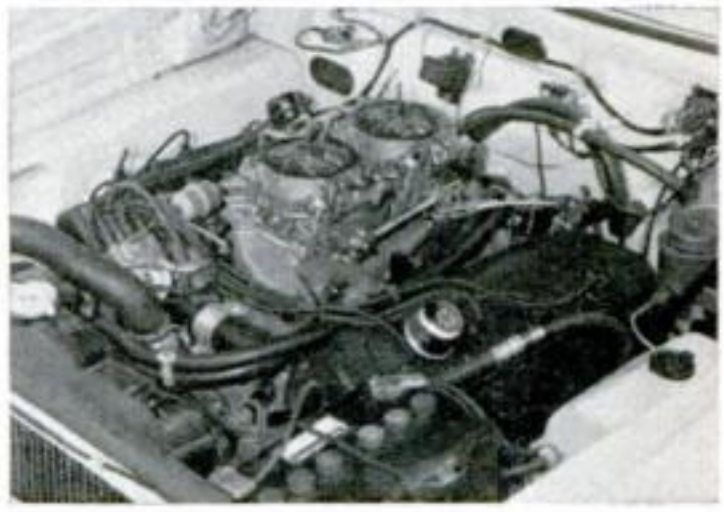


Urheberrechtlich geschütztes Material

**Dodge Coronet** is the other star, with its new look and one of the most powerful engines in the industry: the dual four-barrel Hemi-426. This engine, with rally suspension, makes the Coronet one of the most agile non-racing cars in existence. For comfort, it offers a new heater/air conditioner, new bucket seats, and a good many new interior refinements.

**'66 DODGE CORONET OPTIONS**

| Engine | 225 Six | 273 V-8 | 318 V-8 | 361 V-8 | 383 V-8 | 426 V-8 |
|---|---|---|---|---|---|---|
| Compression | 8.4 | 8.8 | 9.0 | 9.0 | 10.0 | 10.25 |
| Carburetor | 1-bbl. | 2-bbl. | 2-bbl. | 2-bbl. | 4-bbl. | 2 4-bbl. |
| Power @ r.p.m. | 145 @ 4,400 | 180 @ 4,200 | 230 @ 4,400 | 265 @ 4,400 | 325 @ 4,800 | 425 @ 5,000 |
| Transmission | 3 \| Auto. | 3 \| Auto. | 3 \| Auto. | 3 \| 4 \| Auto. | 3 \| 4 \| Auto. | 3 \| 4 \| Auto. |
| Axle ratio | 3.23 \| 2.93 | 3.23 \| 2.94 | 3.23 \| 2.94 | 3.23 | 3.23 | 3.23 |
| Non-slip diff. | Opt. | Opt. | Opt. | Opt. | Opt. | Opt. |
| Disk brakes | No | No | No | No | No | No |
| Power brakes | Opt. | Opt. | Opt. | Opt. | Opt. | Opt. |
| HD brakes | Spl. order | Spl. order | Spl. order | Spl. order | Spl. order | Spl. order |
| Power steering | Opt. | Opt. | Opt. | Opt. | Opt. | Opt. |
| Quick steering | No | No | No | No | No | No |
| Handling kit | Opt. | Opt. | Opt. | Opt. | Opt. | Opt. |
| Bigger wheels | Opt. | Opt. | Opt. | Opt. | Opt. | Opt. |



tric motors. Most valuable option may be the tilt-and-telescope steering wheel.

**CORONET** is Dodge's counterpart to the Belvedere, but slightly longer (117-inch wheelbase). While the main underbody and chassis components are the same as last year, the engines have been moved 1½ inches back to improve weight distribution. Brakes are bigger and linings are thicker, but the highest-performance Dodge is the one you can't get with disk brakes.

**CHRYSLER** will introduce its 300-M later in the season. In the meantime, the plain 300 gets a high-performance 383 V-8, and the New Yorker gets the new 440 V-8 as standard. Rear springs are softer on all, brakes better.

CONTINUED

**Chrysler 300** must not be confused with the still undisclosed 300-M, as the plain 300 is just a heavy, though sporty-looking, coupe without anything in particular to recommend it.

**PLYMOUTH** lineup this year consists of the Fury I, II, III, Sport Fury, and VIP. The last is a deluxe model to compete with Ford's LTD and Chevrolet's Caprice. The power options go as far as the 350-hp. wedge-head 440 V-8, and front disk brakes are available. Wheelbase is 119 inches (except station wagons, which are built on a 121-inch wheelbase).

The rear springs have been made softer and the rear shock absorbers revalved to appeal more to those who want optimum comfort at low speed. The optional rally suspension consists of heavy-duty leaf springs, torsion bars, shock absorbers, and a reinforced stabilizer.

**Plymouth Sport Fury** has new shell-type bucket seats, new center console, and new transmission linkages. A tilt-and-telescope steering wheel is available as an option. The Sport Fury comes only as a hardtop coupe or as a convertible.

**'66 PLYMOUTH FURY OPTIONS**

| Engine | 225 Six | 318 V-8 | 383 V-8 | | 440 V-8 |
|---|---|---|---|---|---|
| Compression | 8.4 | 9.0 | 9.2 | 10.0 | 10.1 |
| Carburetor | 1-bbl. | 2-bbl. | 2-bbl. | 4-bbl. | 2-bbl. |
| Power @ r.p.m. | 145 @ 4,000 | 230 @ 4,400 | 270 @ 4,400 | 325 @ 4,800 | 350 @ 4,400 |
| Transmission | 3 \| Auto. | 3 \| Auto. | 3 \| Auto. | 3 \| 4 \| Auto. | 4 \| Auto. |
| Axle ratio | 3.23 | 3.23 \| 2.94 | 3.23 \| 2.94 | 3.23 \| 2.94 | 3.23 \| 2.94 |
| Non-slip diff. | Opt. | Opt. | Opt. | Opt. | Opt. |
| Disk brakes | Opt. | Opt. | Opt. | Opt. | Opt. |
| Power brakes | Opt. | Opt. | Opt. | Opt. | Opt. |
| Power steering | Opt. | Opt. | Opt. | Opt. | Opt. |
| Quick steering | No | No | No | No | No |
| Handling kit | Opt. | Opt. | Opt. | Opt. | Opt. |
| Bigger wheels | Opt. | Opt. | Opt. | Opt. | Opt. |

**'66 DODGE POLARA AND MONACO OPTIONS**

| Engine | 318 V-8 | 383 V-8 | | 440 V-8 |
|---|---|---|---|---|
| Compression | 9.0 | 9.2 | 10.0 | 10.1 |
| Carburetor | 2-bbl. | 2-bbl. | 4-bbl. | 2-bbl. |
| Power @ r.p.m. | 230 @ 4,400 | 270 @ 4,400 | 325 @ 4,800 | 350 @ 4,400 |
| Transmission | 3 \| Auto. | 3 \| Auto. | 3 \| 4 \| Auto. | 3 \| Auto. |
| Axle ratio | 3.23 | 3.23 \| 2.76 | 3.23 \| 2.76 | 3.23 \| 2.76 |
| Non-slip diff. | Opt. | Opt. | Opt. | Opt. |
| Disk brakes | Opt. | Opt. | Opt. | Opt. |
| Power brakes | Opt. | Opt. | Opt. | Opt. |
| Power steering | Opt. | Opt. | Opt. | Opt. |
| Quick steering | No | No | No | No |
| Handling kit | Opt. | Opt. | Opt. | Opt. |
| Bigger wheels | Opt. | Opt. | Opt. | Opt. |

**DODGE** has two full-size series: Polara and Monaco, built on a 121-inch wheelbase. Power train and chassis options closely parallel those of the Plymouth Fury, but much of what's new inside the big Dodge is keyed not to sales appeal but to quality and durability. Some units, such as the new power brakes, have been simplified in the process of being redesigned to give better pedal feel, and thus need less maintenance and give longer life.

No six-cylinder engines are available in the big Dodges. The 383-cu.-in. V-8 is standard; the economy option, a 318-cu-in. V-8, is available only in the four-door sedans. At the top end, there is the 350-hp. 440-cu.-in. V-8 developed for the Imperial.

**Dodge Polara** is available with the 350-hp. engine shared by New Yorker and Imperial. Rear suspension is softer than on '65 model for boulevard ride, but handling package is optional.

**Dodge Monaco** is a deluxe edition of the full-size Dodge and has all the Polara options, including Tilt-and-Tel wheel, rear-seat heater, new shell-type bucket seats, and front disks.



Urheberrechtlich geschütztes Material

# At GENERAL MOTORS
# More Variety Everywhere

**Oldsmobile explores front drive but continues conventional lines; Pontiac's Sprint Six challenges medium-size V-8s; Buick offers three Gran Sports: Skylark, Wildcat, Riviera**

***CHEVY II*** has a new outer skin and sports a three-speed all-synchromesh gearbox as its base-model transmission. A plastic panel between fenders and skirts protects against corrosion. Sixes have 13-inch wheels; V-8s, 14.

***CORVAIR*** can be identified as a 1966 model only by slight changes in lights, chrome, and trim. There are no mechanical changes. A handling kit—stiffer coil springs, 14:1 steering ratio—is optional.

***CORVETTE*** has been steadily developed, since the Sting Ray came out in 1963, to the point where it can challenge any production sports car on a road course.

CONTINUED

**Chevy II** gets a face lift but loses its convertibles (the only convertible compacts offered in 1966 are Corvair, Valiant, and American). The Chevy II chassis is unchanged, with coil springs at the front and tapered single-leaf suspension at the rear.

**'66 CHEVY II OPTIONS**

| Engine | 153 Four | 194 Six | 230 Six | 283 V-8 | | 327 V-8 | |
|---|---|---|---|---|---|---|---|
| Compression | 8.5 | 8.5 | 8.5 | 9.25 | 9.25 | 10.5 | 11.0 |
| Carburetor | 1-bbl. | 1-bbl. | 1-bbl. | 2-bbl. | 4-bbl. | 4-bbl. | 4-bbl. |
| Power @ r.p.m. | 90 @ 4,000 | 120 @ 4,400 | 140 @ 4,400 | 195 @ 4,800 | 220 @ 4,800 | 275 @ 4,800 | 350 @ 5,800 |
| Transmission | 3 \| Auto. | 3 \| Auto. | 3 \| Auto. | 3 \| 4 \| Aut. | 3 \| 4 \| Auto. | 3 \| 4 \| Auto. | 3 \| 4 |
| Axle ratio, std. | 3.08 | 3.08 | 3.08 | 3.08 | 3.08 | 3.08 | 3.07 \| 3.31 |
| Axle ratio, opt. | 3.55 \| No | 3.36 \| No | 3.36 \| No | 3.36 \| 3.55 \| No | 3.36 \| 3.55 \| No | No | No \| 3.55 3.73 |
| Non-slip diff. | Opt. | Opt. | Opt. | Opt. | Opt. | Opt. | |
| Disk brakes | No | No | No | No | No | Opt. | |
| Power brakes | Opt. | Opt. | Opt. | Opt. | Opt. | Opt. | |
| HD brakes | Opt. | Opt. | Opt. | Opt. | Opt. | Opt. | |
| Power steering | Opt. | Opt. | Opt. | Opt. | Opt. | Opt. | |
| Quick steering | No | No | No | No | No | Opt. | |
| Handling kit | Opt. | Opt. | Opt. | Opt. | Opt. | Opt. | |
| Bigger wheels | Opt. | Opt. | Opt. | Std. | Std. | Opt. | |

**Corvair** continues practically unchanged from 1965, with 140-hp. four-carburetor and 180-hp. turbocharger options on the air-cooled flat six.

**Corvette** has new power options (up to 425 hp.) and can be driven like a racing car—see the author's reclined attitude and straight arms.

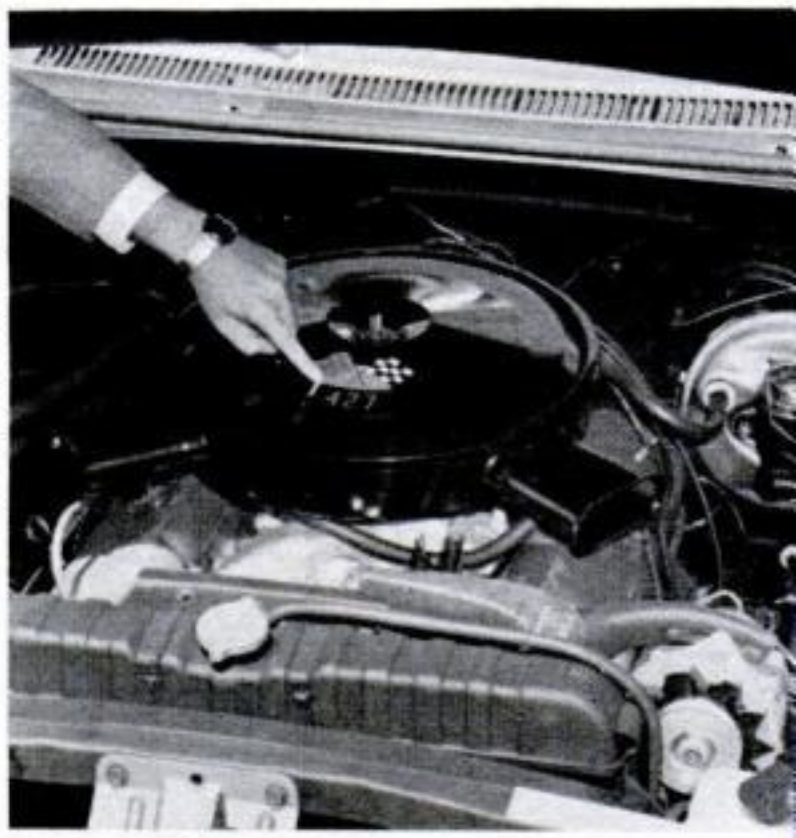


Urheberrechtlich geschütztes Material

**Chevrolet Impala SS** has a special suspension kit that comes with the Turbo-Jet V-8. It keeps body roll moderate even on a 110-m.p.h. turn without any great loss of ride comfort.

## '66 CHEVROLET OPTIONS

| Engine | 250 Six | 283 V-8 | | | | | | 327 V-8 | | 396 V-8 | | | 427 V-8 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Compression | 8.5 | 9.25 | | | 9.25 | | | 10.5 | | 10.25 | | | 10.25 | | 11.0 | |
| Carburetor | 1-bbl. | 2-bbl. | | | 4-bbl. | | | 4-bbl. | | 4-bbl. | | | 4-bbl. | | 4-bbl. | |
| Power @ r.p.m. | 155 @ 4,200 | 195 @ 4,800 | | | 220 @ 4,800 | | | 275 @ 4,800 | | 325 @ 4,800 | | | 390 @ 5,200 | | 425 @ 5,600 | |
| Transmission | 3 | Aut. | 3 | 4 | Aut. | 3 | 4 | Aut. | 3 | 4 | Aut. | 3 | 4 | Aut. | 3 | 4 |
| Axle ratio, std. | 3.08 | 3.08 | 3.08 | 3.36 | 3.08 | 3.08 | 3.36 | 3.08 | 3.36 | 3.08 | 3.31 | 3.07 | 2.73 | 3.31 | 2.73 | 3.31 | 3.31 |
| Axle ratio, opt. | 3.36 3.55 | No | 3.36 3.55 | 3.55 | 3.36 | 3.36 | 3.55 | 3.36 | No | | No | | | No | | No | 3.55 3.73 |
| Non-slip diff. | Opt. | Opt. | | | Opt. | | | Opt. | | Opt. | | | Opt. | | Opt. | |
| Disk brakes | No | No | | | No | | | No | | No | | | No | | No | |
| Power brakes | Opt. | Opt. | | | Opt. | | | Opt. | | Opt. | | | Opt. | | Opt. | |
| HD brakes | Opt. | Opt. | | | Opt. | | | Opt. | | Opt. | | | Opt. | | Opt. | |
| Power steering | Opt. | Opt. | | | Opt. | | | Opt. | | Opt. | | | Opt. | | Opt. | |
| Quick steering | No | No | | | No | | | No | | No | | | No | | No | |
| Handling kit | Opt. | Opt. | | | Opt. | | | Opt. | | Opt. | | | Opt. | | Opt. | |
| Bigger wheels | Opt. | Opt. | | | Opt. | | | Opt. | | Opt. | | | Opt. | | Opt. | |



Chevrolet's 427-cu.-in. V-8 is based on porcupine-head 396 [PS, May]. It comes in two versions: a 390-hp. street engine (available with Turbo-HydraMatic) and high-performance 425-hp. engine. Latter has mechanical valve lifters, extra-large four-barrel carburetor. It's available only with three- or four-speed manual shift.

**Chevrolet Caprice** is now a separate series. The outside is plain Chevrolet with a black vinyl top—the inside is like a Cadillac. The Caprice's chassis is identical with the Impala's.

**CHEVROLET** has reinforced its hardtop and convertible frames, revised the body mounting system, developed a new all-synchro three-speed manual transmission (standard on all models), and made the three-speed Turbo-HydraMatic optional in conjunction with the 396- and 427-cu.-in. engines. The new base-model 250 six and the smaller eights are teamed with the old two-speed Powerglide. Improvement in brakes is concentrated on durability, and new shock absorbers with softer cushioning are designed for longer life (better surface finish and shape consistency on piston rods, and better sealing). New options include tilt-telescope steering wheels and an integrated air-conditioning and heating system called "Comfortron." Station-wagon tire size is up (8.55-14) and nylon tires are optional.



Urheberrechtlich geschütztes Material

**Chevelle** has new outer sheet metal with new roof and fender lines, new grille and bumpers, new instrument panel, and new front and rear lamps. The chassis design is unchanged.

**CHEVELLE** also gets the new three-speed manual transmission. Both the 194 and 230 sixes continue. The Malibu SS has been replaced by the Super Sport 396—and the 396 V-8 comes in 325- and 360-hp. versions, both with hydraulic lifters. Special springs are available (but not on wagons).

**PONTIAC** shows some styling refinements but has little engineering news for 1966. During the 1965 model year, Pontiac options were in such demand that 76 percent of all cars were built to order.

CONTINUED

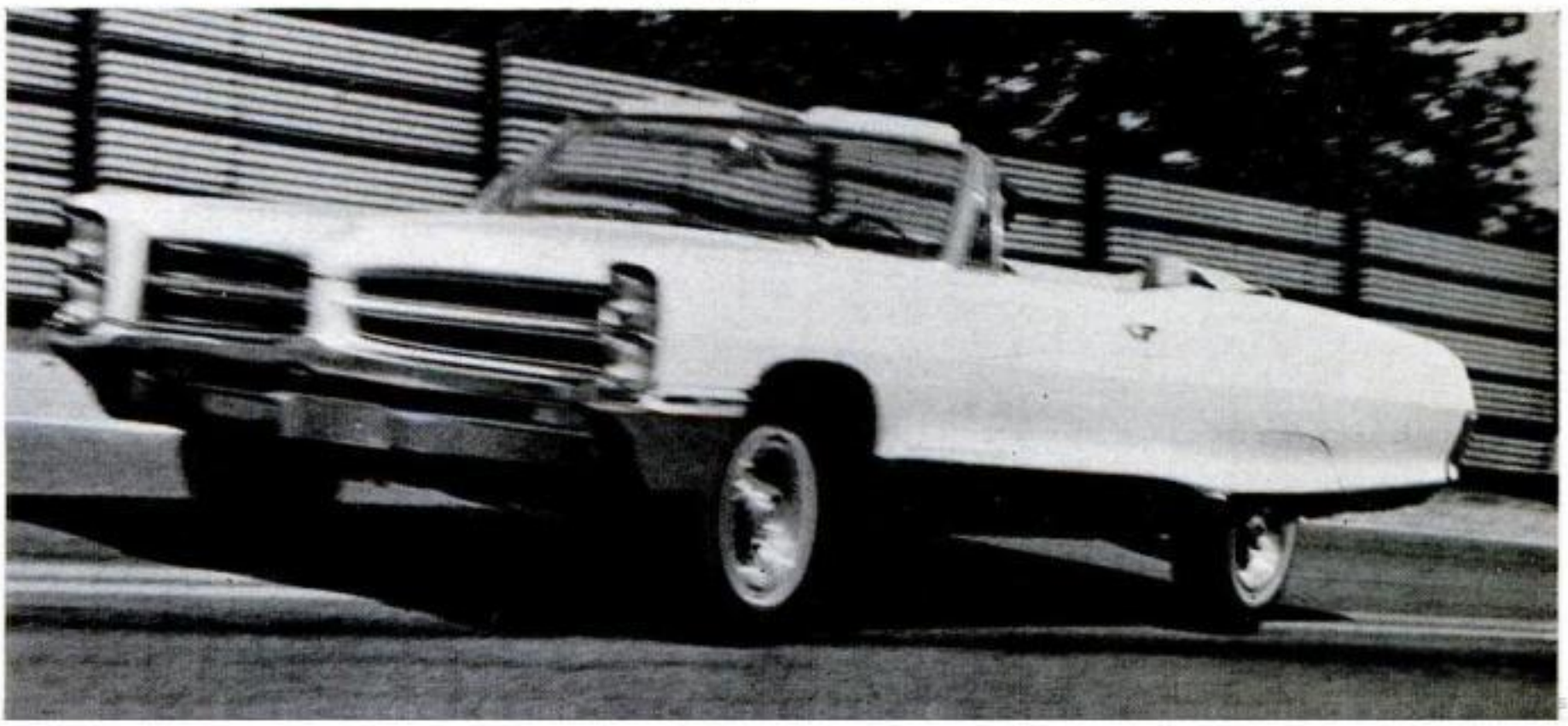
**'66 CHEVELLE OPTIONS**

| Engine | 194 Six | 230 Six | 283 V-8 | | 327 V-8 | 396 V-8 | |
|---|---|---|---|---|---|---|---|
| Compression | 8.5 | 8.5 | 9.25 | 9.25 | 10.5 | 10.25 | 10.25 |
| Carburetor | 1-bbl. | 1-bbl. | 2-bbl. | 4-bbl. | 4-bbl. | 4-bbl. | 4-bbl. |
| Power @ r.p.m. | 120 @ 4,400 | 140 @ 4,400 | 195 @ 4,800 | 220 @ 4,800 | 275 @ 4,800 | 325 @ 4,800 | 360 @ 5,200 |
| Transmission | 3 / Auto. | 3 / Auto. | 3 / 4 / Auto. | 3 / 4 / Auto. | 3 / 4 / Auto. | 3 / 4 / Auto. | 3 / 4 / Auto. |
| Axle ratio, std. | 3.08 / 3.08 | 3.08 / 3.08 | 3.08 / 3.08 | 3.08 / 3.08 | 3.08 | 3.31 | 3.31 |
| Axle ratio, opt. | 3.36 / No | 3.36 / No | 3.36 / No | No | No | 3.07<br>3.55<br>3.73 | 3.07<br>3.55<br>3.73 |
| Non-slip diff. | Opt. | Opt. | Opt. | Opt. | Opt. | Opt. | Opt. |
| Disk brakes | No | No | No | No | No | No | No |
| Power brakes | Opt. | Opt. | Opt. | Opt. | Opt. | Opt. | Opt. |
| HD brakes | Opt. | Opt. | Opt. | Opt. | Opt. | Opt. | Opt. |
| Power steering | Opt. | Opt. | Opt. | Opt. | Opt. | Opt. | Opt. |
| Quick steering | No | No | No | No | No | No | No |
| Handling kit | Opt. | Opt. | Opt. | Opt. | Std. | Std. | Std. |
| Bigger wheels | No | No | No | No | Opt. | Std. | Std. |

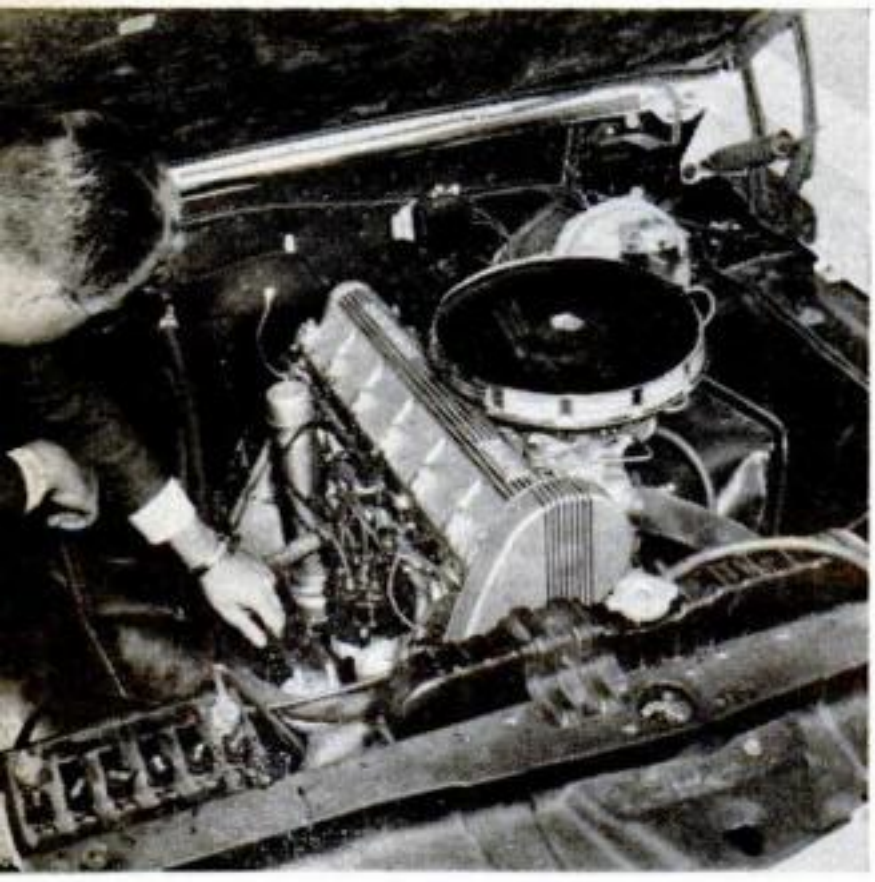
**'66 PONTIAC OPTIONS**

| Engine | 389 V-8 | | | | 421 V-8 | | |
|---|---|---|---|---|---|---|---|
| Compression | 8.61 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | |
| Carburetor | 2-bbl. | 2-bbl. | 4-bbl. | 4-bbl. | 4-bbl. | 3 2-bbl. | |
| Power @ r.p.m. | 256 @ 4,600 | 290 @ 4,600 | 325 @ 4,800 | 333 @ 5,000 | 338 @ 4,600 | 356 @ 4,600 | 376 @ 5,000 |
| Transmission | 3 / Auto. | Auto. | Auto. | 3 / 4 | 3 / 4 / Auto. | 3 / 4 | Auto. |
| Axle ratio, std. | 3.23 / 2.41 | 2.41 | 2.56 | 3.23 | 3.42 / 3.08 | 3.42 | 3.23 |
| Axle ratio, opt. | 3.08 | 2.56<br>2.93 | 2.41<br>2.73<br>2.93<br>3.08 | 3.08<br>3.42 | 3.23 / 2.73<br>3.23 | 3.23 | 3.08 |
| Non-slip diff. | Opt. | Opt. | Opt. | Opt. | Opt. | Opt. | |
| Disk brakes | No | No | No | No | No | No | |
| Power brakes | Opt. | Opt. | Opt. | Opt. | Opt. | Opt. | |
| HD brakes | Opt. | Opt. | Opt. | Opt. | Opt. | Opt. | |
| Power steering | Opt. | Opt. | Opt. | Opt. | Opt. | Opt. | |
| Quick steering | No | No | No | No | No | No | |
| Handling kit | Opt. | No | No | Opt. | Opt. | Opt. | |
| Bigger wheels | Opt. | Opt. | Opt. | Opt. | Opt. | Opt. | |

**Pontiac Bonneville convertible** proves that the car builders at Wide-Track-Town are still among the leaders in high-speed stability. New options: vacuum door locks, Strato bucket seats.



**Tempest Le Mans** is now available as a four-door hardtop (with vinyl roof). Total length is up ½ inch, and the track is one inch wider in the rear (59 inches). This does not add roll stiffness, but makes it more difficult to overturn the car.



**Sprint Six engine** with four-barrel carburetor develops 207 hp., revs freely to over 6,000 r.p.m., and is a joy to drive. Now if Pontiac would only put three two-barrel side-draft carbs on this engine, with suitable ram pipes . . .

**Tempest station wagon** has a wind deflector to keep the rear window clean—PS Automotive Editor drove it on a dry, hot, sunny day and can't tell you how well it works. Standard tire size on Tempest wagons for 1966 is 7.75-14 for both six-cylinder and V-8 engines.

## '66 PONTIAC TEMPEST OPTIONS

| Model | Tempest and Le Mans | | | | | | | GTO | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Engine | 230 Six | | | | 326 V-8 | | | 389 V-8 | | |
| Compression | 9.0 | | 10.5 | | 9.2 | | 10.5 | 10.75 | | 10.75 |
| Carburetion | 1-bbl. | | 4-bbl. | | 2-bbl. | | 4-bbl. | 4-bbl. | | 3 2-bbl. |
| Power @ r.p.m. | 165 @ 4,700 | | 207 @ 5,200 | | 250 @ 4,600 | | 285 @ 5,000 | 335 @ 5,000 | | 360 @ 5,200 |
| Transmission | 3 | Auto. | 4 | Auto. | 3 | 4 | Auto. | 3 | 4 | Auto. |
| Axle ratio, std. | 3.08 | 2.56 | 3.55 | 2.56 | 3.23 | 3.23 | 2.56 | 3.55 | 3.55 | 3.23 |
| Axle ratio, opt. | No | 2.93 | No | 2.93 | 3.08<br>3.36 | 3.08<br>3.36 | 2.93<br>3.23 | 3.23 | 3.23 | 3.08<br>3.55 |
| Non-slip diff. | Opt. | | | | Opt. | | | Opt. | | |
| Disk brakes | No | | | | No | | | No | | |
| Power brakes | Opt. | | | | Opt. | | | Opt. | | |
| HD brakes | Opt. | | | | Opt. | | | Opt. | | |
| Power steering | Opt. | | | | Opt. | | | Opt. | | |
| Quick steering | No | | | | No | | | Opt. | | |
| Handling kit | No | | | | No | | | Opt. | | |
| Bigger wheels | Opt. | | | | Opt. | | | Opt. | | |

The list of options and accessories has been extended to give the customer a greater choice in the areas of driving pleasure, comfort, ease of operation, and safety. New options include vacuum door locks, Strato bucket seats, and headrests. Pontiac's drum brakes have proved among the best in the past—now they have further improvements: more lining material assures less fade, faster recovery, and a more positive stopping feel.

***TEMPEST*** is the car for the options-conscious buyer. The number of possible variations on the Tempest puts even the Mustang in the shade. Practically all of last year's GTO production was built to customers' specifications. For 1966, the GTO is a separate series instead of a mere option on the Le Mans model.

The new single-OHC six [PS, August] with a one-barrel carburetor is the base engine in the Tempest line. With a QuadraJet it becomes the Sprint Six and delivers enough power to make it competitive with some medium-size V-8s.

Improvements in the V-8s include a new cast nodular-iron crankshaft and new all-aluminum pistons with piston rings that feature a new reverse-twist design for better oil economy.

The basic three-speed manual transmission now has a synchromesh first gear, and the automatic transmissions have been recalibrated for more suitable shift points (and smoother shifts).

**Oldsmobile 98** is basically the 1965 model with extra options, retouched appearance, some suspension modifications, and a new carburetor. Turbo-HydraMatic transmission and a 3.08:1 axle are standard.

Urheberrechtlich geschütztes Material

**Tempest Le Mans,** restyled, borrows upper fender lines from the big Pontiacs and gets a new plastic grille (light, inexpensive, corrosion-proof). The wheels shown are optional.

***OLDSMOBILE*** has important chassis improvements in the full-size models. Springs have been lowered, and shock absorbers have been revalved for a smoother, quieter ride. The front stabilizer bar has been reinforced to reduce body roll on turns. New body mounts give improved isolation from the frame. Automatic level control is optional on F-85s as well as the big Oldsmobiles. Introduced by Cadillac last year, it consists of a vacuum-driven compressor with a pressure regulator and a storage tank, a vacuum connection to the engine, a rear height-control valve, and air-adjustable shock absorbers. This year Oldsmobile has the best-looking instrument panels, with large, circular dials and an optional tach. The era of the floor-mounted tach or vacuum gauge is over. (In Lansing, that is. They crop up where you least expect it—now it's Pontiac's turn to fit instruments the driver cannot see.) An in-line six replaces the F-85's V-6.

CONTINUED

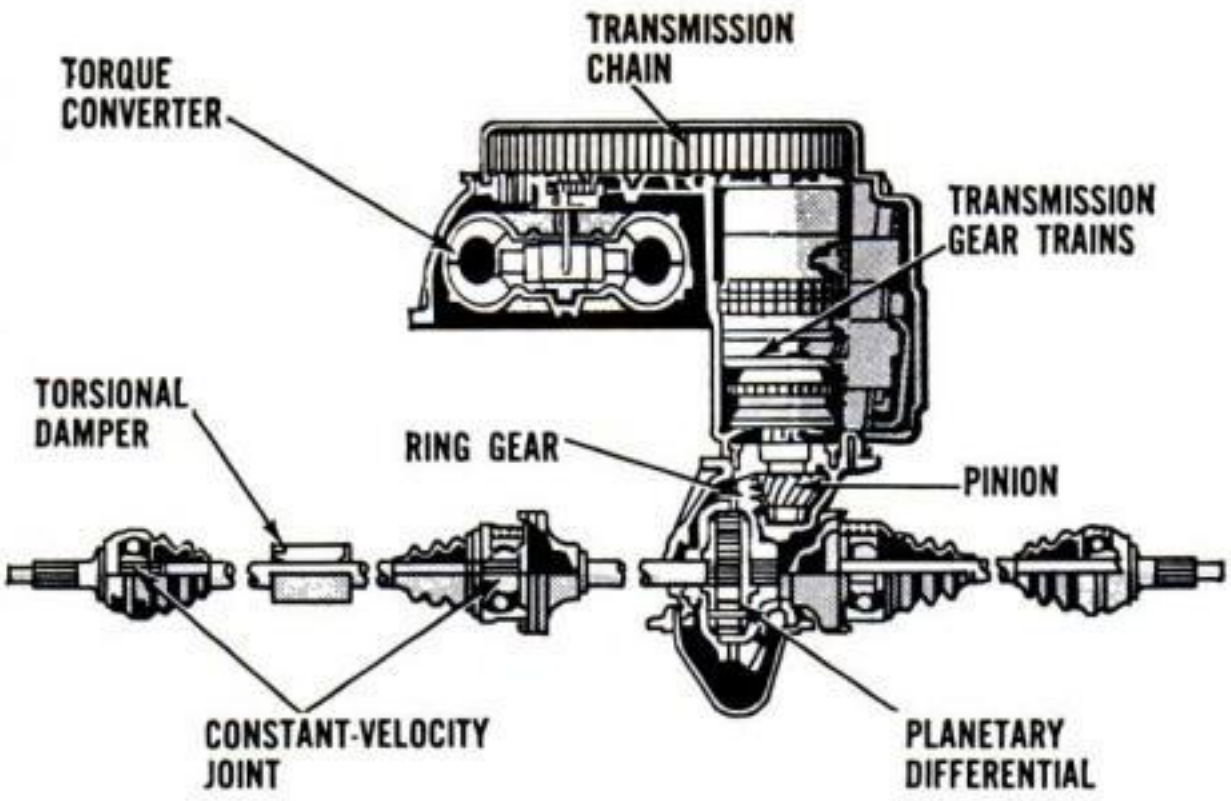
**'66 OLDSMOBILE F-85 OPTIONS**

| Model | F-85 | | | | | | Cutlass | | | 4-4-2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Engine | 250 Six | | | 330 V-8 | | | 330 V-8 | | | 400 V-8 | | |
| Compression | 8.5 | | | 9.0 | | | 10.25 | | | 10.25 | | |
| Carburetor | 1-bbl. | | | 2-bbl. | | | 4-bbl. | | | 4-bbl. | | |
| Power @ r.p.m. | 155 @ 4,200 | | | 250 @ 4,800 | | | 320 @ 5,200 | | | 350 @ 4,800 | | |
| Transmission | 3 | 4 | Auto. | 3 | 4 | Auto. | 3 | 4 | Auto. | 3 | 4 | Auto. |
| Axle ratio | 3.08 | | 2.78 | 3.08 | | 2.78 | 3.23 | | 3.08 | 3.55 | 3.55 | 3.23 |
| Non-slip diff. | Opt. | | | Opt. | | | Opt. | | | Opt. | | |
| Disk brakes | No | | | No | | | No | | | No | | |
| Power brakes | Opt. | | | Opt. | | | Opt. | | | Opt. | | |
| HD brakes | No | | | No | | | No | | | Opt. | | |
| Power steering | Opt. | | | Opt. | | | Opt. | | | Opt. | | |
| Quick steering | Opt. | | | Opt. | | | Opt. | | | Opt. | | |
| Handling kit | No | | | No | | | No | | | Std. | | |
| Bigger wheels | Opt. | | | Opt. | | | Opt. | | | Opt. | | |

**Oldsmobile Starfire** stakes its future on sports appeal—it's now available with a four-speed floor shift, Strato bucket seats, and tilt-telescope steering, but has no handling package.

**Oldsmobile Cutlass Supreme** is a special four-door hardtop version of the F-85. Despite its smaller size, its deluxe interior makes it comparable with the LTD, VIP, DPL, and Caprice.

Urheberrechtlich geschütztes Material




**Toronado drive train** is extremely compact. The drawing (right) shows how the Turbo-Hydra-Matic transmission was split, with the torque converter on the flywheel side and the planetary gear trains alongside (with reverse helix angles for reverse rotation). Fitting the belt drive behind the converter assures absence of power pulses and gives longer belt life. The differential is of the planetary type, which provides a built-in limited-slip (torque-bias) effect.

**TORONADO** is the official name for the car that has long been known at Oldsmobile and POPULAR SCIENCE as XP-784 [PS, April '65]. Many of its good points stem directly from its front drive:

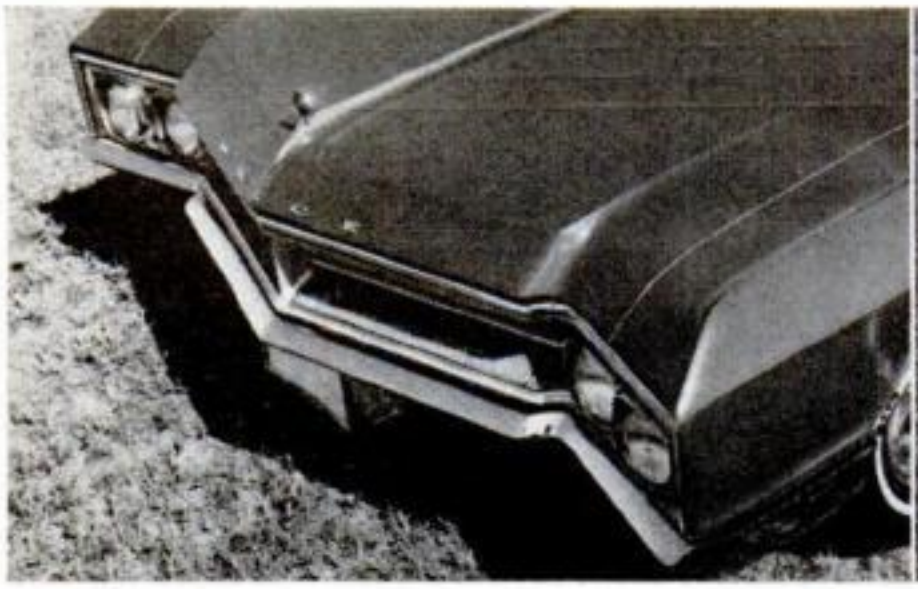
- High directional stability on the straight.
- Low center of gravity, assuring less body roll on turns, less side movement on bumps.
- Strong self-centering tendency in the front wheels on turns.
- Higher cornering ability, with assurance that the front wheels will keep turning even at extreme slip angles (say, in rain or snow).
- No risk of rear-wheel skids (the rear axle is just along for the ride).
- Better retention of directional control under heavy braking.

How Oldsmobile engineered the Toronado to take full advantage of its potential is a long story, but here are some highlights:

- Torsional damper on right drive shaft to eliminate drive-train vibration.

**'66 BUICK WILDCAT OPTIONS**

| Model | Wildcat | | Wildcat Gran Sport |
|---|---|---|---|
| Engine | 401 V-8 | | 425 V-8 |
| Compression | 10.25 | | 10.25 |
| Carburetor | 4-bbl. | | 4-bbl. |
| Power @ r.p.m. | 325 @ 4,400 | | 340 @ 4,400 |
| Transmission | 3 | Auto. | Auto. |
| Axle ratio | 3.42 | 3.07 | 3.07 |
| Non-slip diff. | Opt. | | Std. |
| Disk brakes | No | | No |
| Power brakes | Opt. | | Opt. |
| HD brakes | No | | No |
| Power steering | Opt. | | Opt. |
| Quick steering | No | | Opt. |
| Handling kit | No | | Std. |
| Bigger wheels | No | | No |

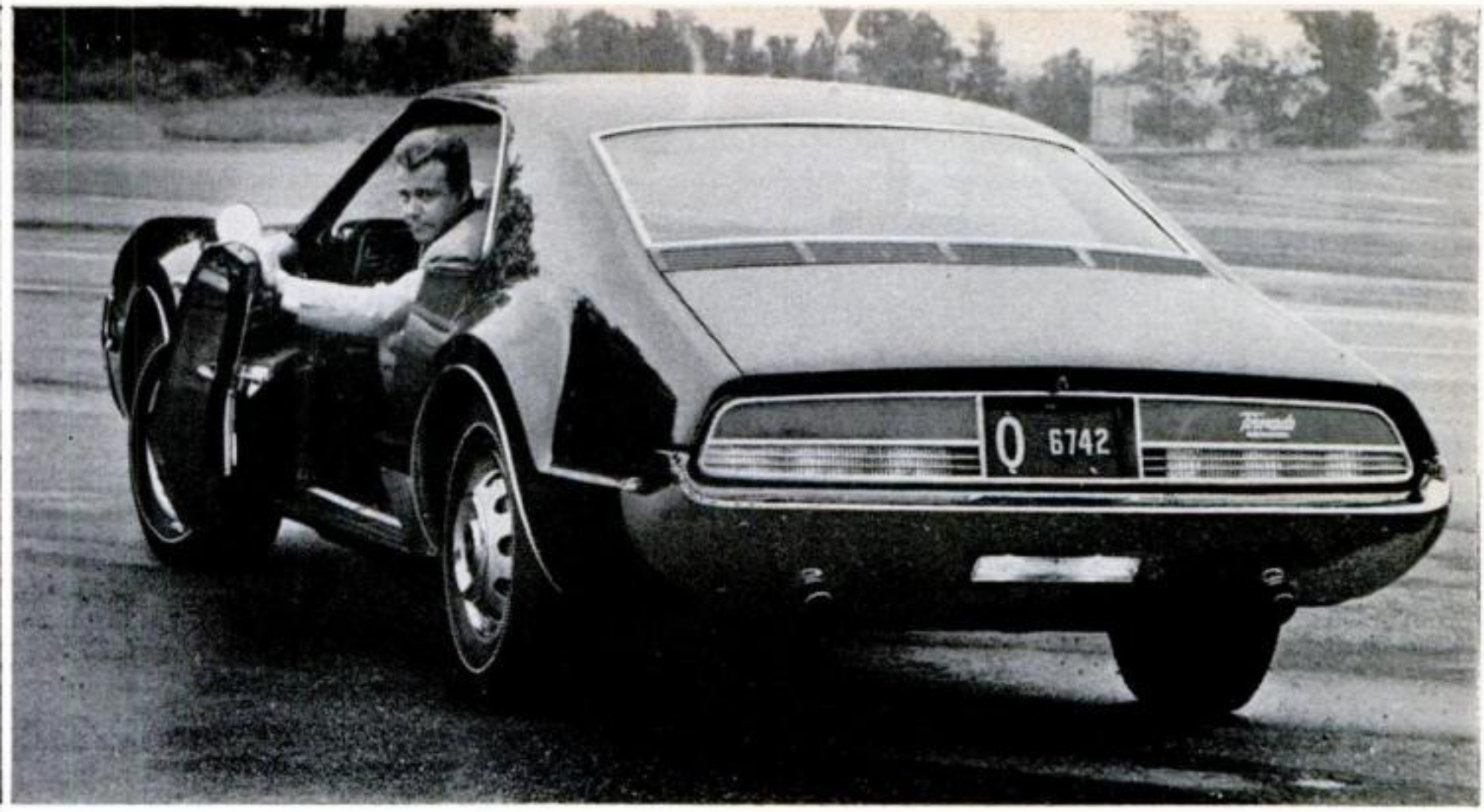


**Buick Wildcat** snout shows why it's called a W-front. Built on a 126-inch wheelbase, Wildcat Gran Sport is one of the largest sporty cars in existence. A 15:1 power steering is optional.

**Buick LeSabre** is smallest of the big Buicks, but is more controllable than the Special in tight spots and on narrow, winding roads. LeSabre 400 series has a 340-hp. Wildcat engine.



Urheberrechtlich geschütztes Material




- Shock absorber on steering linkage to assure freedom from wheel kick.
- Two sets of rear shock absorbers (vertical and horizontal) for better ride control.
- Front springs 90 percent stiffer than the Starfire's; rear springs 60 percent stiffer.
- Rear-wheel steering effect under body roll limited to ½-percent oversteer.

**BUICK** has heavier frames on all models, redesigned rubber bushings in the front suspension, revalved shock absorbers, and increased steering ratios. Wildcat and Electra have a new rear axle with stronger pinion and ring-gear support, wider spacing of the differential gear bearings, increased oil flow, and larger ring gear and pinion for better durability.

**'66 TORONADO AND STARFIRE OPTIONS**

| Model | Toronado | Starfire | | |
|---|---|---|---|---|
| Engine | 425 V-8 | | | |
| Compression | 10.5 | | | |
| Carburetor | 4-bbl. | | | |
| Power @ r.p.m. | 385 @ 4,800 | 375 @ 4,800 | | |
| Transmission | Auto. | 3 | 4 | Auto. |
| Axle ratio | 3.21 | 3.23 | 3.23 | 3.08 |
| Non-slip diff. | Std. | Opt. | | |
| Disk brakes | No | No | | |
| Power brakes | Std. | Opt. | | |
| HD brakes | No | No | | |
| Power steering | Std. | Opt. | | |
| Quick steering | No | No | | |
| Handling kit | Std. | No | | |
| Bigger wheels | Std. | No | | |

**'66 BUICK SKYLARK OPTIONS**

| Model | Skylark | | | | | | Skylark Gran Sport | | |
|---|---|---|---|---|---|---|---|---|---|
| Engine | 225 V-6 | | 300 V-8 | | 340 V-8 | | 400 V-8 | | |
| Compression | 9.0 | | 9.0 | | 9.0 | | 10.25 | | |
| Carburetor | 2-bbl. | | 2-bbl. | | 4-bbl. | | 4-bbl. | | |
| Power @ r.p.m. | 160 @ 4,200 | | 210 @ 4,600 | | 260 @ 4,000 | | 325 @ 4,400 | | |
| Transmission | 3 | Auto. | 3 | Auto. | 3 | Auto. | 3 | 4 | Auto. |
| Axle ratio | 3.23 | 2.93 | 3.08 | 2.78 | 3.36 | 3.23 | 3.36 | 3.36 | 3.08 |
| Non-slip diff. | Opt. | | Opt. | | Opt. | | Opt. | | |
| Disk brakes | No | | No | | No | | No | | |
| Power brakes | Opt. | | Opt. | | Opt. | | Opt. | | |
| HD brakes | No | | No | | No | | Std. | | |
| Power steering | Opt. | | Opt. | | Opt. | | Opt. | | |
| Quick steering | No | | No | | No | | No | | |
| Handling kit | No | | No | | No | | Std. | | |
| Bigger wheels | No | | No | | No | | Std. | | |

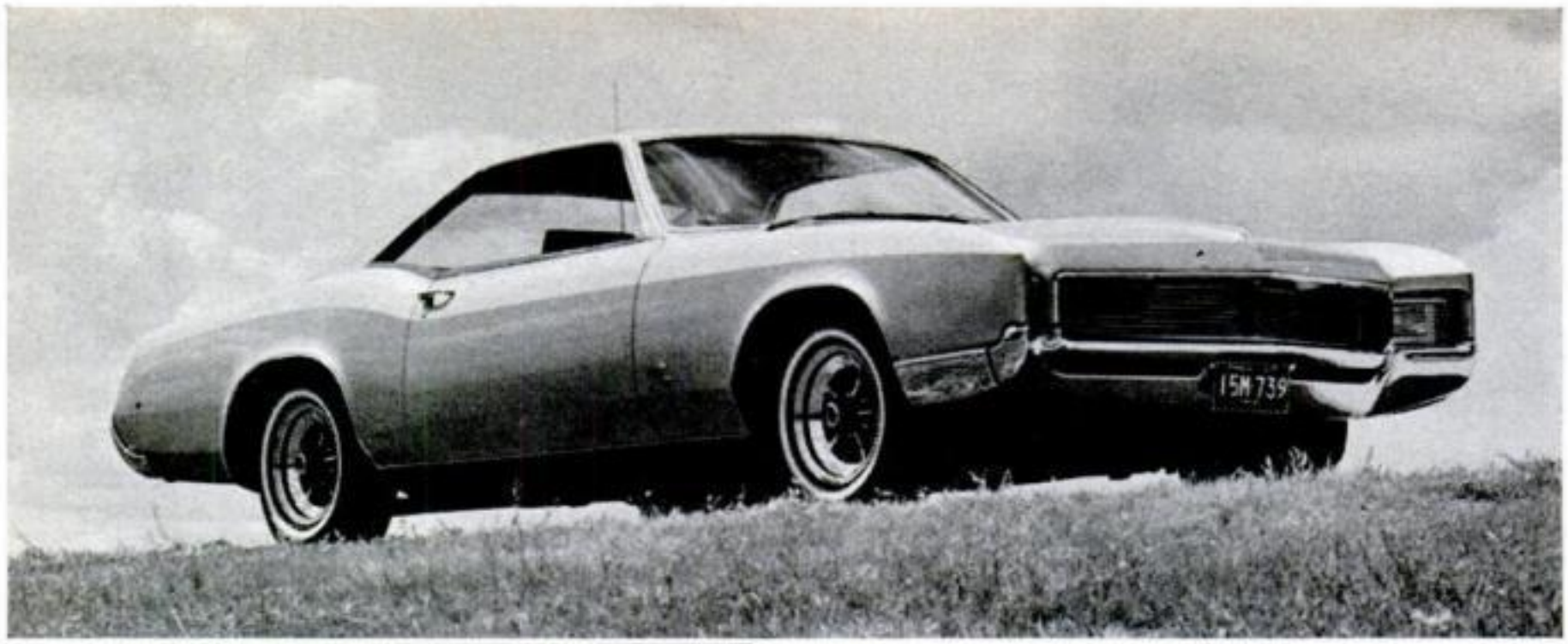
CONTINUED

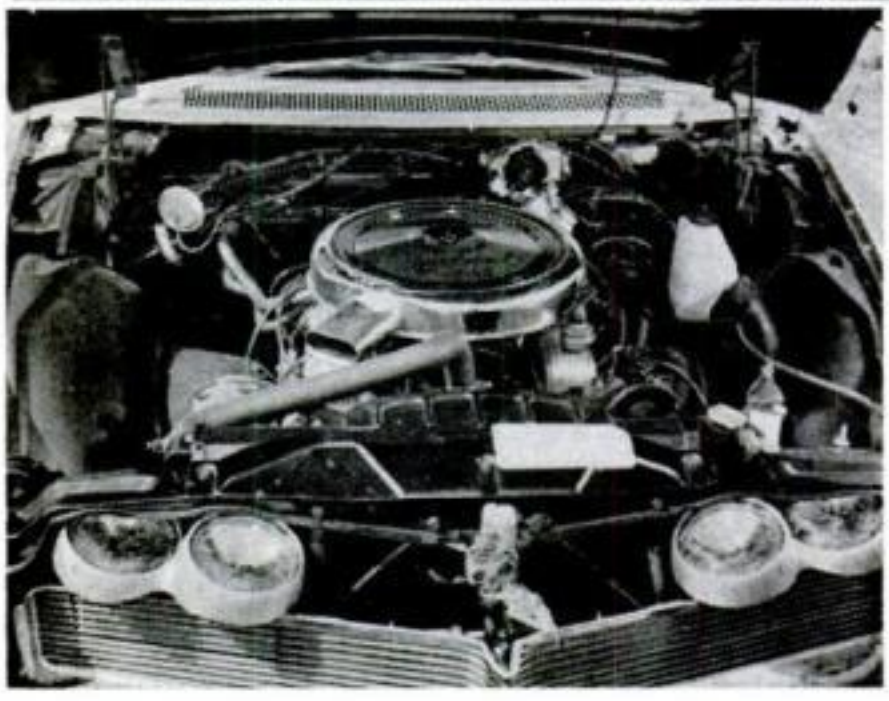
**Buick Skylark Gran Sport** has wider rear track, reinforced perimeter frame, a suspension system adapted for high-torque V-8. Unlike Olds 4-4-2, the Buick has no rear stabilizer.

**Buick Special** has a softer ride and higher roll stiffness, a new three-speed all-synchro manual or an improved two-speed Super Turbine automatic transmission. V-6 now puts out 160 hp.



Urheberrechtlich geschütztes Material





**Buick Riviera** shares the inner body panels with the Olds Toronado but has its own distinctive outer skin. Square windows on both sides of the grille are parking lights—the real headlamps are concealed under the hood. When turned on, they pivot into position. Regular engine is a 340-hp. V-8; a dual four-barrel version (360 hp.) is a dealer-installed option.

**Standard Riviera** is now a six-seater with a bench-type front seat and column-shift—automatic transmission (bottom photo). Bucket seats with optional headrests and console shift with a new two-pronged lever is the alternative. All instruments are grouped in front of the driver; the glove box is a big drop-in bin.

***RIVIERA*** is a completely rejuvenated automobile with a new cruciform frame, four-inch-wider track, and two-inch-longer wheelbase. All suspension parts have been redesigned, including springs, stabilizer bar, bushings, and shock-absorber valving. A new steering linkage cuts the turn radius. The rear springs have been moved from the carrier arms on top of the axle housing to permit the use of softer springs without risk of excessive sag under heavy loads. New Vibrabond finned aluminum front brake drums improve both heat flow and fade resistance.

***CADILLAC*** offers variable-ratio steering as its big news. Response is slow near the straight-ahead position to assure stability at highway speeds. Continued wheel movement speeds response for greater maneuverability. Last year's constant ratio was 18.2:1—the new ratio varies between 16.7 and 12.

**Cadillac** has many subtle styling changes: The license plate has been moved down, the parking lights have been moved up, the grille has a horizontal divider bar, much chrome has gone.

# At AMERICAN MOTORS Length and Luxury

**Rambler finally gets with it. Perhaps too late, and with too little, they're trying to switch their "sensible" image**

***AMERICAN*** is now the only compact car without a V-8 option. But there's a new base-model six, derived from the smooth and efficient Torque Command Six introduced on the 1965 Classic. The old side-valve six has finally disappeared, and gone with it is the OHV model of the same 195.6-cu.-in. engine. A new model called the Rogue replaces the 440-H hardtop, and American offers one of the very few compact convertibles on the market. Handling package is just shocks and sway bar; disk brakes are not available.

***CLASSIC*** has modified its front suspension. Vertical wheel travel in jounce is ½ inch longer, and the shock absorbers are correspondingly recalibrated. Springs are slightly stiffer, and spring seats are beefed up to guard against cracking. The rear springs have larger rubber pads top and bottom for better isolation of road noise. But the Classic sticks with its antiquated torque-tube drive.

***AMBASSADOR*** sheds its Rambler identity in name only—it's still just a long-wheelbase Classic, but without an optional handling package. Four-on-the-floor comes in 990 series only.

**'66 AMERICAN OPTIONS**

| Engine | 199 Six | 232 Six | |
|---|---|---|---|
| Compression | 8.5 | 8.5 | 8.5 |
| Carburetor | 1-bbl. | 1-bbl. | 2-bbl. |
| Power @ r.p.m. | 128 @ 4,400 | 145 @ 4,300 | 155 @ 4,400 |
| Transmission | 3 \| Auto. | 3 \| Auto. | 3 \| Auto. |
| Axle ratio | 3.08 | 3.31 | 3.31 |
| Non-slip diff. | Opt. | Opt. | Opt. |
| Disk brakes | No | No | No |
| Power brakes | Opt. | Opt. | Opt. |
| HD brakes | No | No | No |
| Power steering | Opt. | Opt. | Opt. |
| Quick steering | No | No | No |
| Handling kit | Opt. | Opt. | Opt. |
| Bigger wheels | Opt. | Opt. | Opt. |

**'66 CLASSIC OPTIONS**

| Engine | 232 Six | | 287 V-8 | 327 V-8 | |
|---|---|---|---|---|---|
| Compression | 8.5 | 8.5 | 8.7 | 8.7 | 9.7 |
| Carburetor | 1-bbl. | 2-bbl. | 2-bbl. | 2-bbl. | 4-bbl. |
| Power @ r.p.m. | 145 @ 4,300 | 155 @ 4,400 | 198 @ 4,700 | 250 @ 4,700 | 270 @ 4,700 |
| Transmission | 3 \| Auto. | 3 \| Auto. | 3 \| 4 \| Auto. | 3 \| 4 \| Auto. | 3 \| 4 \| Auto. |
| Axle ratio | 3.15 | 3.15 | 3.54 | 3.54 | 3.54 |
| Non-slip diff. | Opt. | Opt. | Opt. | Opt. | Opt. |
| Disk brakes | Opt. | Opt. | Opt. | Opt. | Opt. |
| Power brakes | Opt. | Opt. | Opt. | Opt. | Opt. |
| Power steering | Opt. | Opt. | Opt. | Opt. | Opt. |
| Quick steering | No | No | No | No | No |
| Handling kit | Opt. | Opt. | Opt. | Opt. | Opt. |
| Bigger wheels | Opt. | Opt. | Opt. | Opt. | Opt. |

**Marlin** gets a new grille, and four-on-the-floor now replaces the Twin-Stick. A sway bar is standard with both sixes and V-8s; HD springs and shocks optional.

**Rambler American** is now 181 inches long, but the added length is shared between front and rear overhang—none of it has been used to improve the interior.

**Ambassador** has been stretched from 197 to 199 inches overall. There is more luggage space, but rear leg room remains the same. Front disks continue optional.

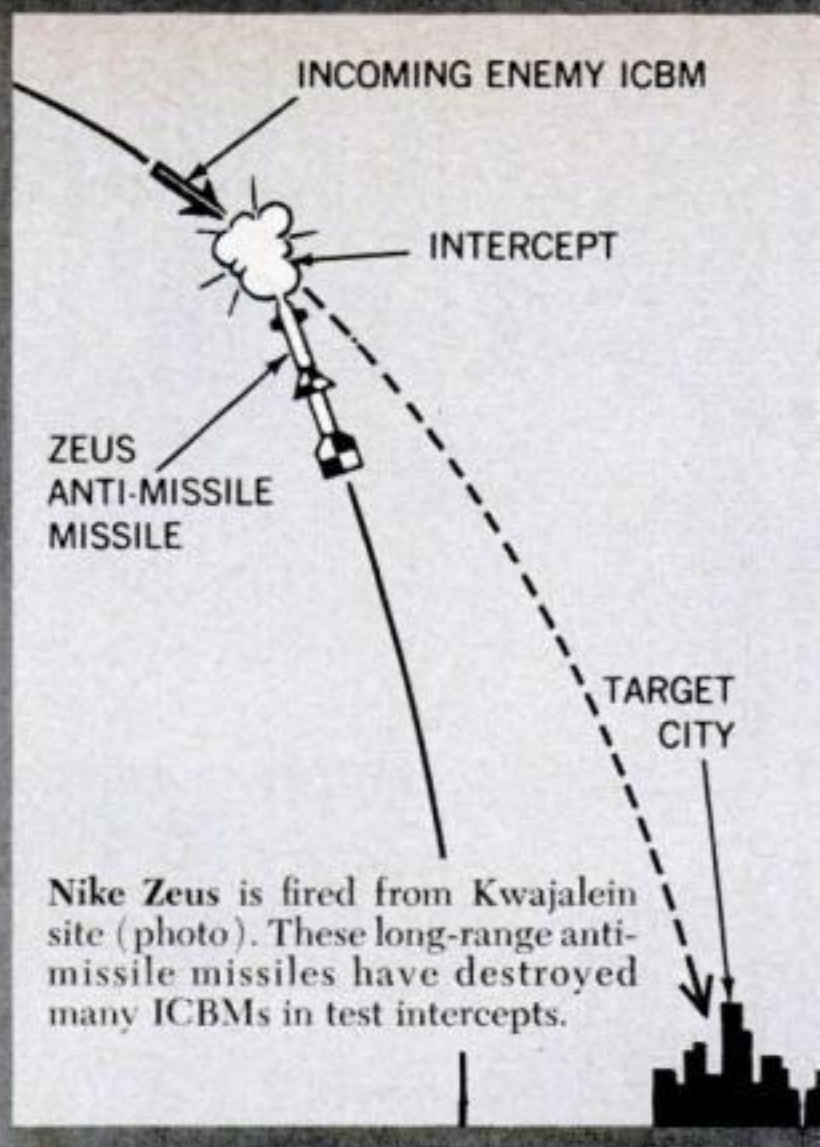
**Rambler Rebel** (revived) sets out to represent Rambler in the ranks of the sporty cars and halfway makes it. HD suspension is inadequate; highest power is 270 hp.



Urheberrechtlich geschütztes Material

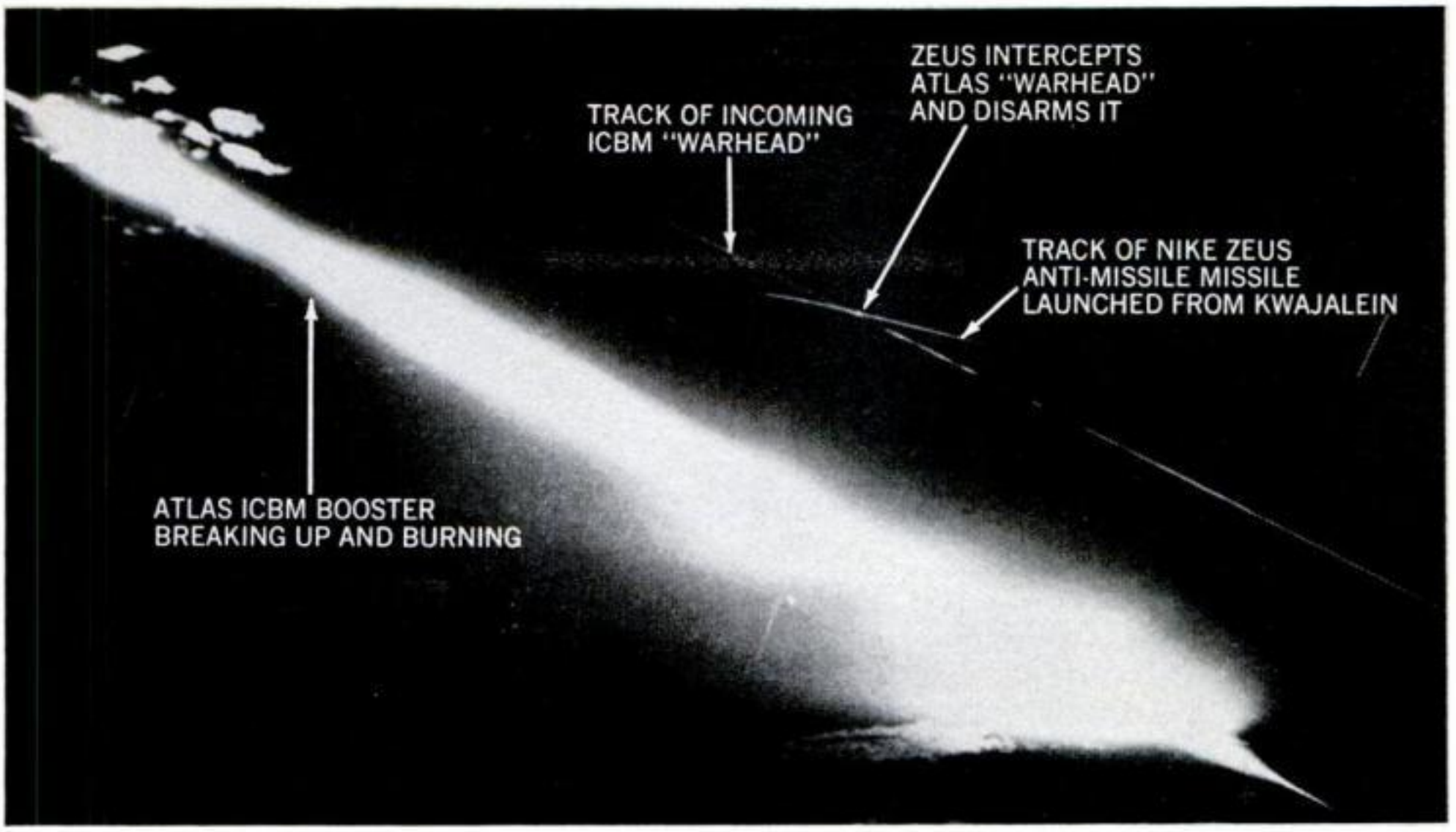
# The Truth About Our Missile Defense

## Do we have an operational anti-missile missile? Most Americans think so. They're wrong. Here are the facts about Nike-X




**Nike Zeus** is fired from Kwajalein site (photo). These long-range anti-missile missiles have destroyed many ICBMs in test intercepts.

Urheberrechtlich geschütztes Material



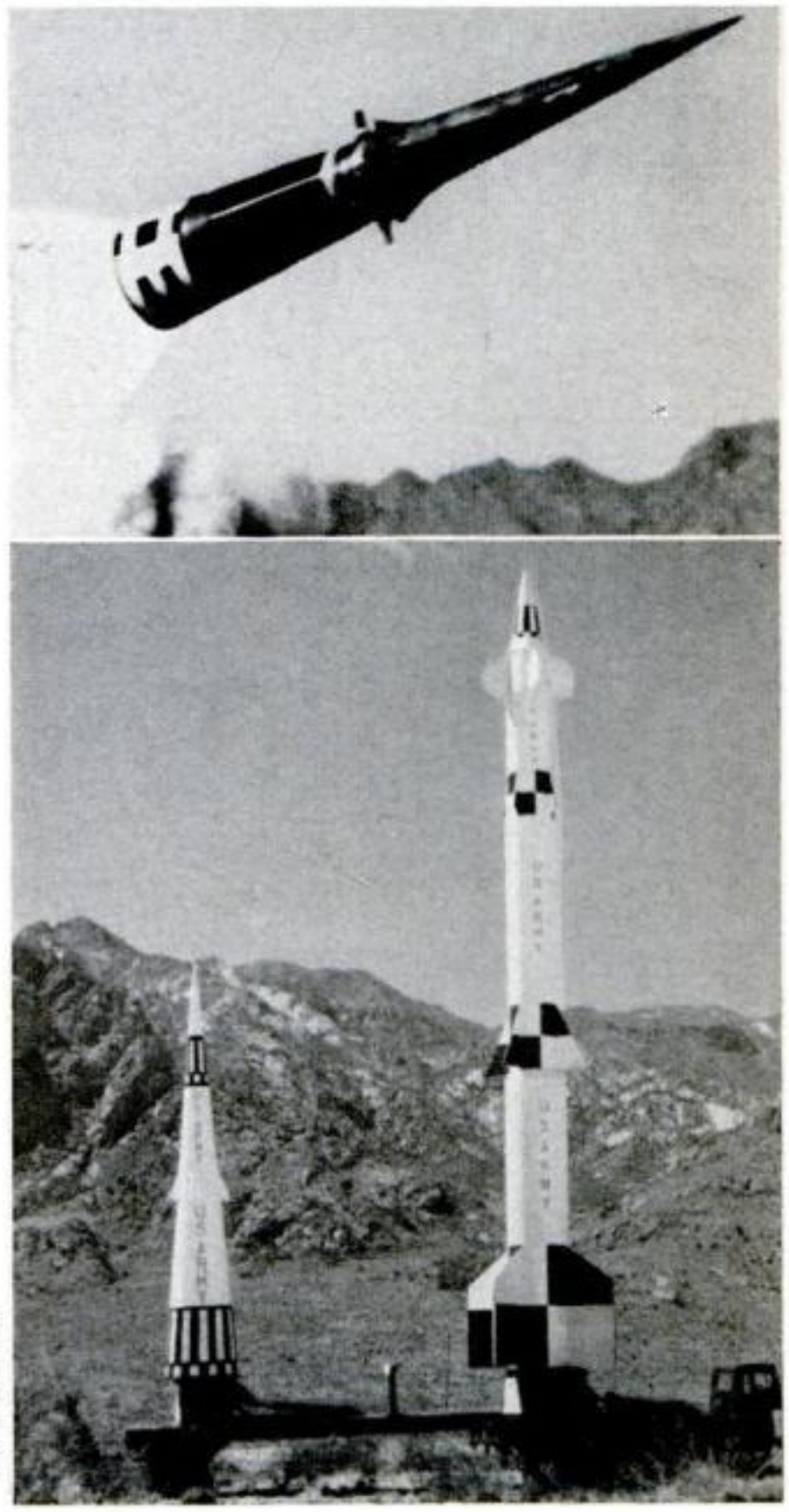

**Intercept:** Atlas ICBM nose cone (coming from left) is disarmed by Nike Zeus in photo above. In foreground, Atlas booster, previously separated from nose cone, burns up. At right, Sprint anti-missile missile is test-fired. Like Zeus, it will be launched from underground silo.

## By Herbert O. Johansen

WE HAVE a fantastically capable anti-missile missile system—on an atoll in the Pacific. Our major cities? They are as defenseless against a well-placed ICBM attack as a haystack against a fire arrow. The reason: money. An effective defense against a nuclear-spiked ICBM (intercontinental ballistic missile) attack would cost up to *$25 billion*—depending on how many cities and people we want to keep "alive." (How many safety belts do you want in your car?)

Fortunately, we have anti-missile missile hardware under development—the Army Nike-X system. It has a high priority—for research and development. Two billion dollars already have been spent. And for this year Nike-X is in the budget for $400 million, with $10 million of it "to prepare for production."

CONTINUED

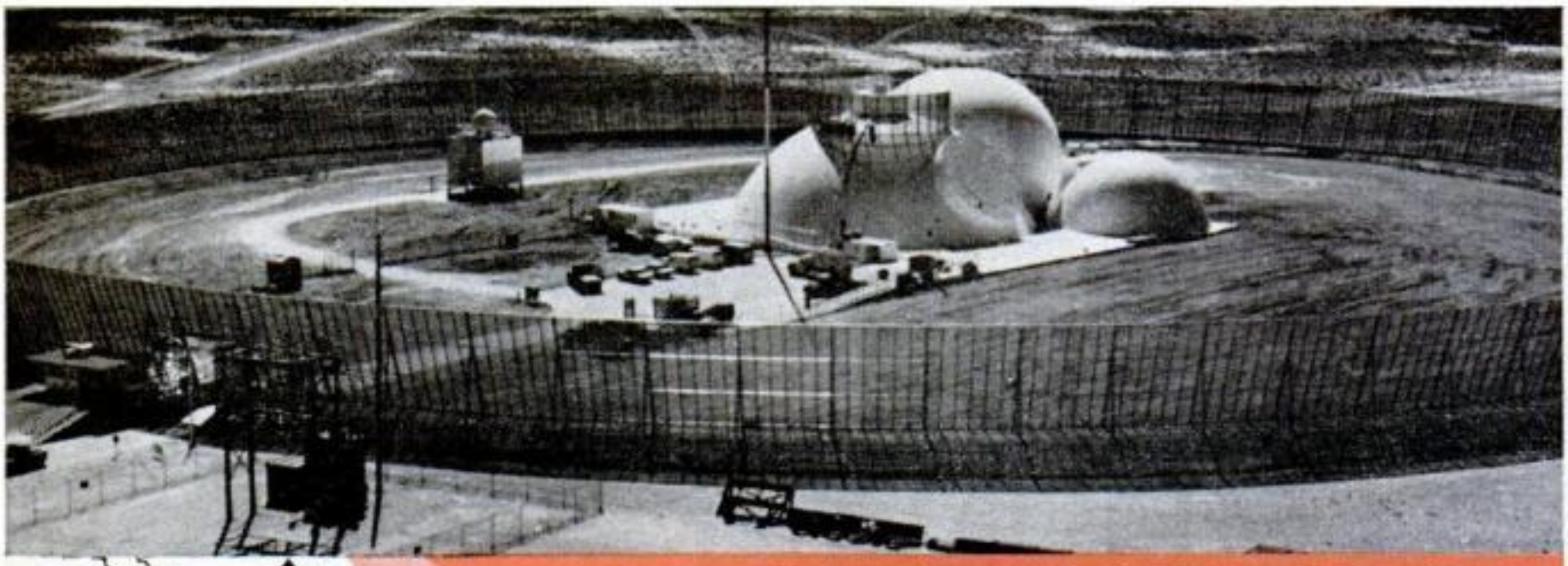


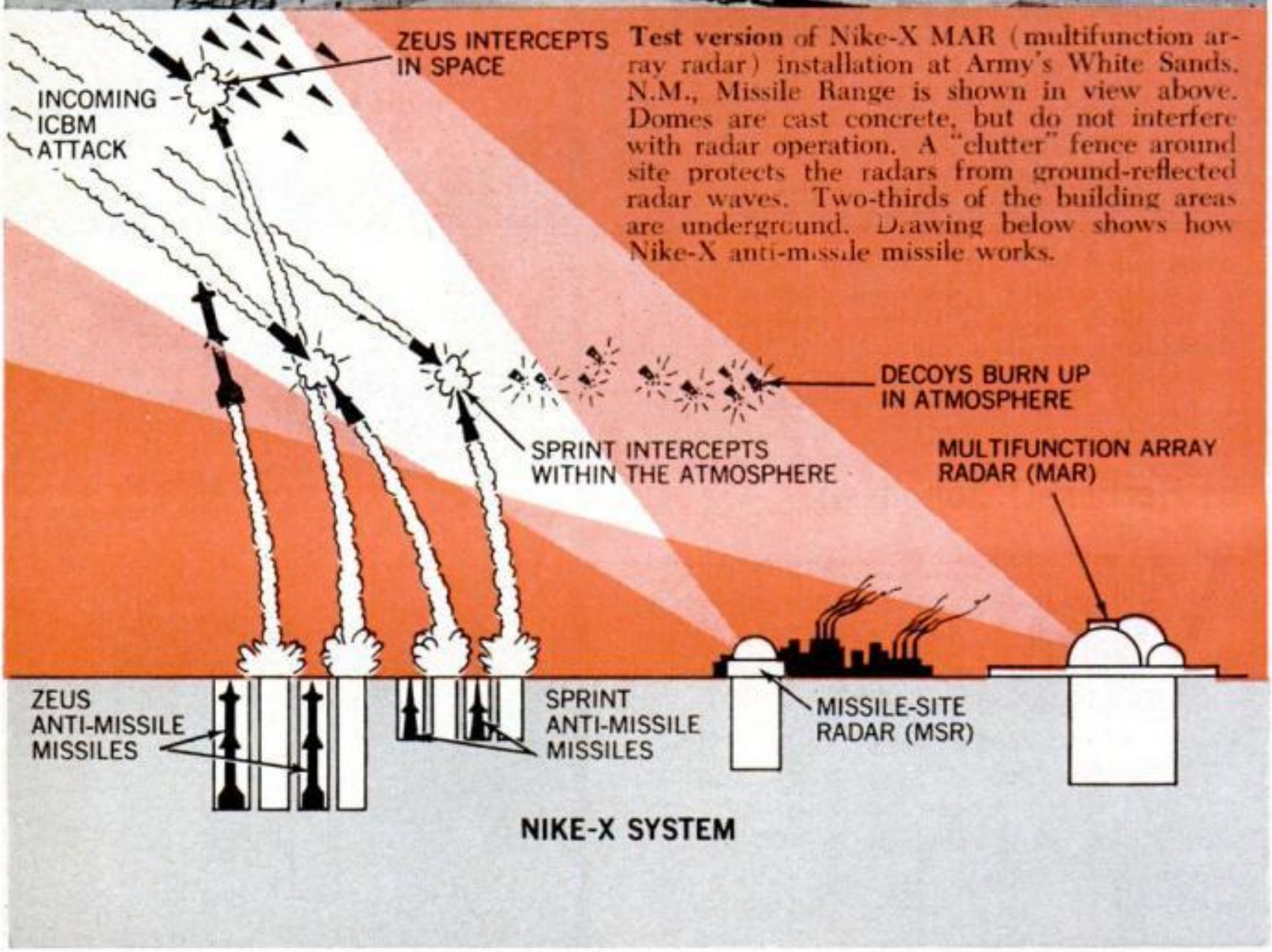
**Speedy Sprint and long-range Zeus**—this pair puts the punch in the experimental Nike-X system. Ground commands guide them to their ICBM targets. Both carry nuclear warheads and can destroy an enemy warhead by just going off nearby.



Urheberrechtlich geschütztes Material

# New Mexico—proving ground for Nike-X radar






**Test version** of Nike-X MAR (multifunction array radar) installation at Army's White Sands, N.M., Missile Range is shown in view above. Domes are cast concrete, but do not interfere with radar operation. A "clutter" fence around site protects the radars from ground-reflected radar waves. Two-thirds of the building areas are underground. Drawing below shows how Nike-X anti-missile missile works.

What is Nike-X? It's a system, not just a missile—or the two missiles that are its missile killers: Nike Zeus and Sprint. Behind them is what is probably the world's smartest radar brain, MAR (photo above).

Nike Zeus, in an advanced stage of development, is a 48-foot-long, three-stage, solid-propellant, "long-range" missile designed to destroy an attacking ICBM speeding—with nuclear warhead—through space at some 18,000 miles an hour.

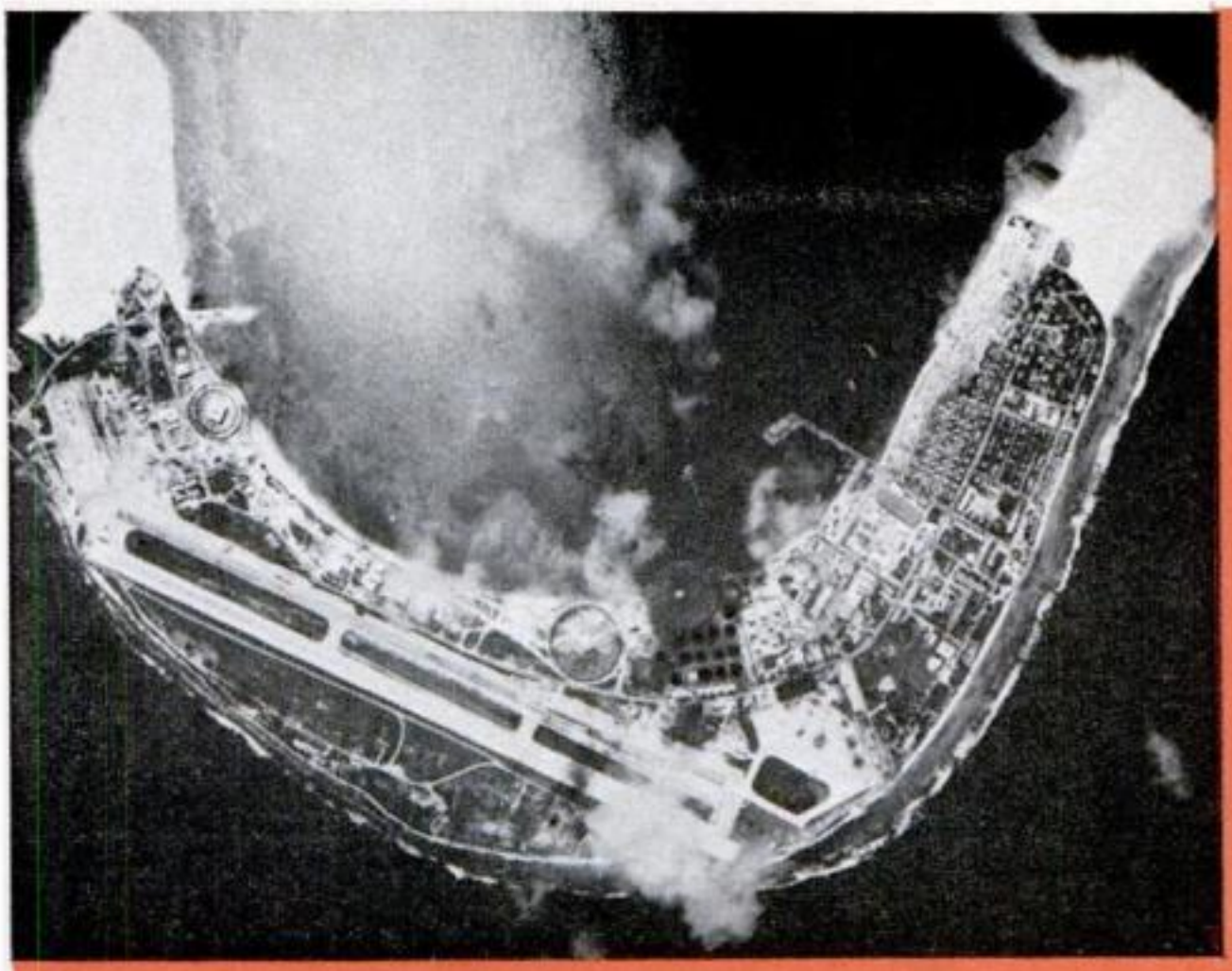
Sprint is a newcomer. A 27-foot, two-stage, solid-propellant missile, it is a backstop for what might get through Zeus; its field of kill is within the atmosphere—right over the target city. With a boost-off acceleration of 100 Gs, Sprint rockets up at a speed of a mile every time your heart beats twice—intercepting an incoming nuclear warhead within seconds. This feat has been vividly described as "catching a bullet with your teeth."

***Destroying a warhead.*** Both Zeus and Sprint carry nuclear warheads and are automatically guided to their targets from the ground. Neither has to make a direct hit to score. In the case of a Zeus-ICBM intercept in space, the neutrons of its atomic

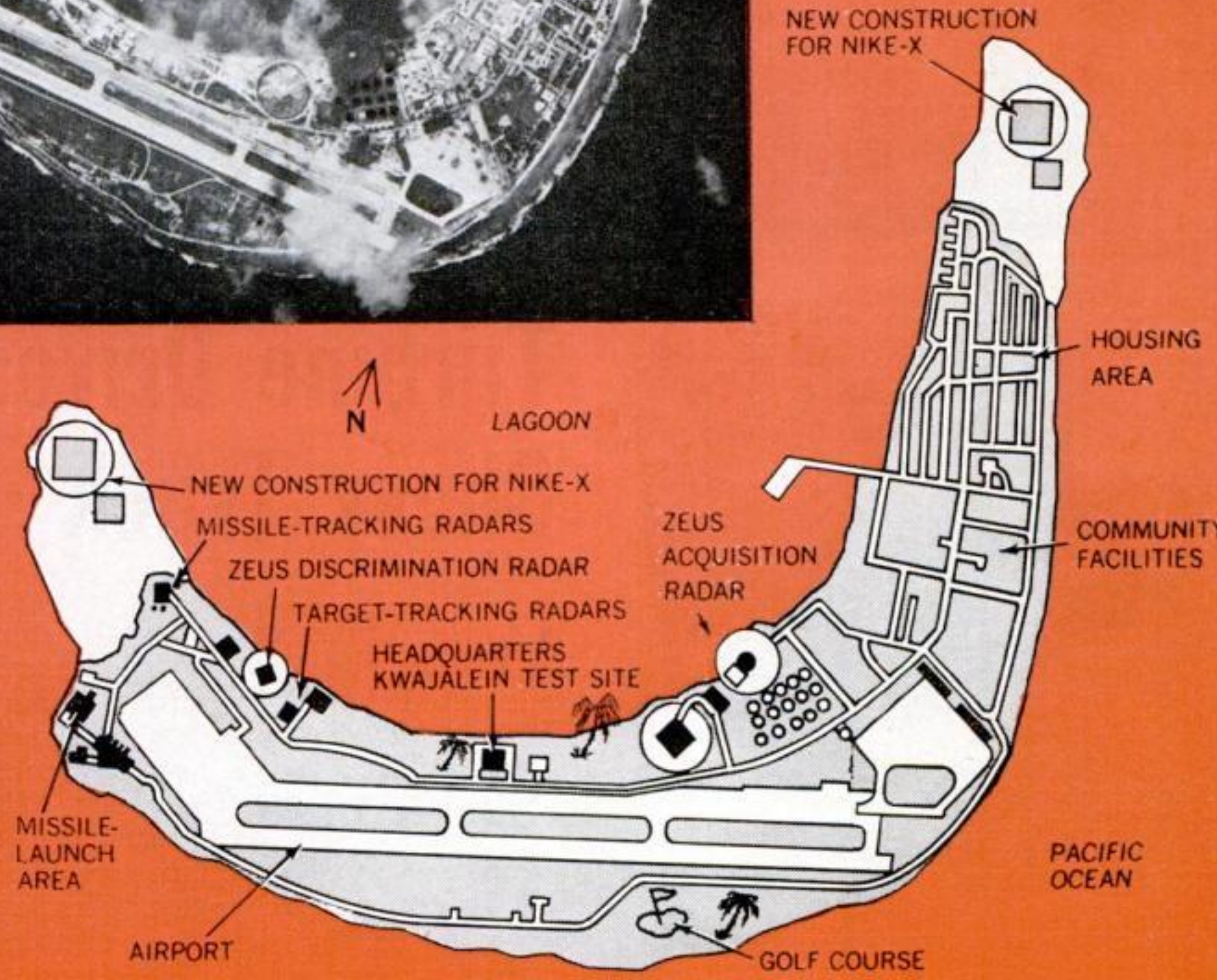


Urheberrechtlich geschütztes Material

# Mid-Pacific atoll has Zeus—will get Sprint missile



**Kwajalein,** an atoll in the central Pacific, is the only place in the Free World that has an operational anti-missile missile defense. From here many Zeus missiles have been fired to intercept and "destroy" Atlas ICBMs launched from Vandenberg Air Force Base, 4,500 miles away in Southern California.




explosion could burn off the warhead's heat-insulating material; and if a high-speed neutron poked even a tiny hole in the ICBM's nuclear warhead, the warhead would burn up on entering the atmosphere as particles of hydrogen and oxygen enlarged the hole.

Because the accuracy of these anti-missile missiles is so great, their nuclear warheads can be small, making the danger of fallout over populated areas minimal. The intercepted enemy nuclear warhead presents no danger: Its nuclear elements are not triggered for a fusion explosion. They are harmlessly destroyed in space or midair.

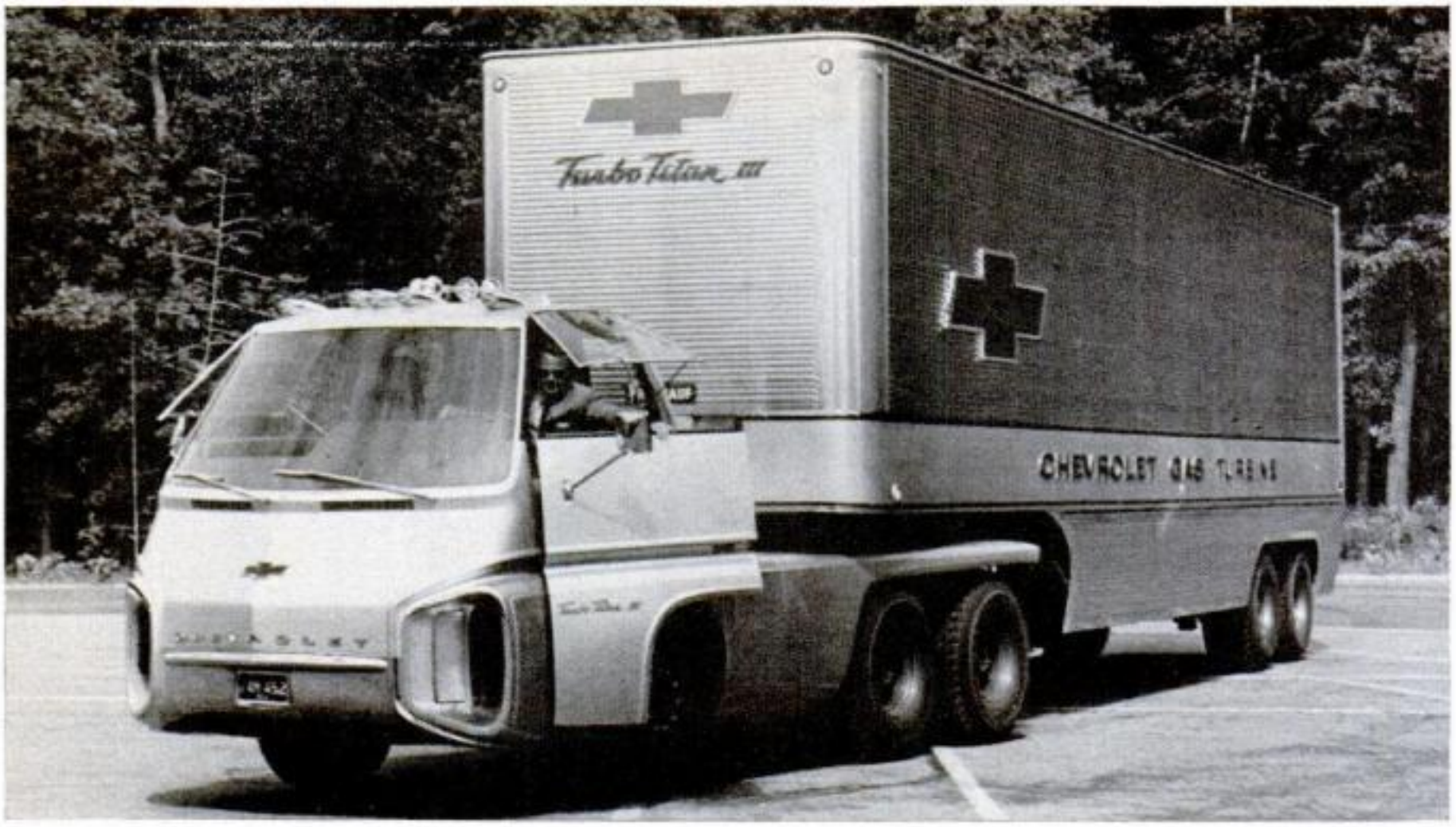
Couldn't enemy ICBMs carry devices to jam the Nike-X radars, confusing their target-spotting "thinking"? That's been considered. In fact, we are experimenting with a radar-reflecting penetration "aid" that would pierce deep into the atmosphere and "spoof" our Nike radars trying to pick up the true warheads. If we can develop such a device, we figure an enemy could do so, too. So we have been at work creating a countermeasure for this countermeasure.

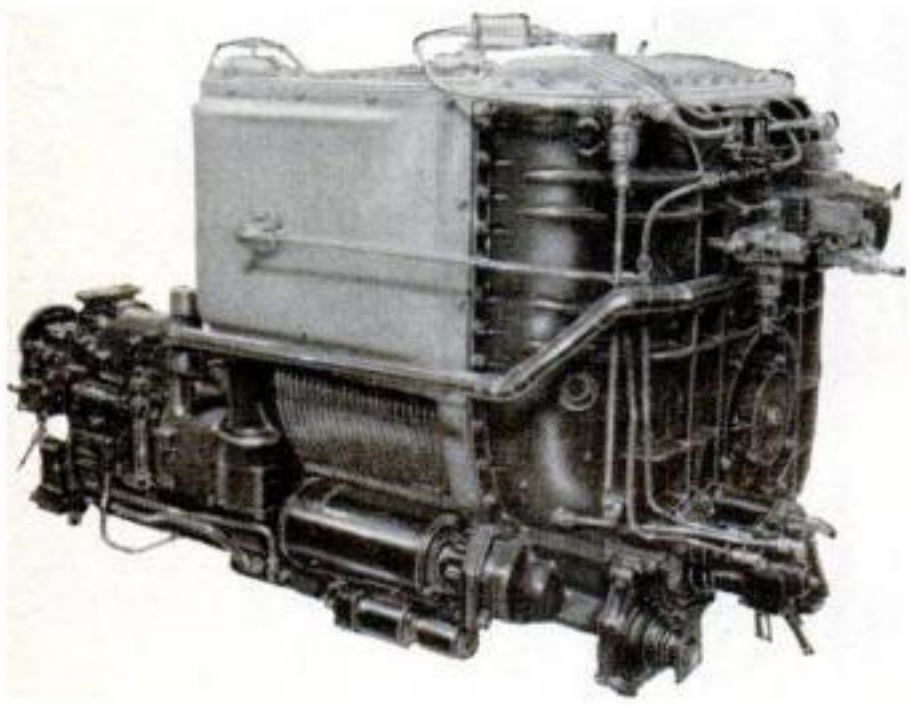
Zeus missiles, launched from Kwajalein

[Continued on page 202]



Urheberrechtlich geschütztes Material



**Engine puts out 280 hp.** at power-turbine speed of 35,000 r.p.m. and geared-down output-shaft speed of 4,000. Huge scoops on tractor (top photo) feed engine, which is piggish for air.

# Turbine Drives Chevy Truck

WHEN Automotive Editor Jan Norbye visited the GM Proving Ground in Milford, Mich., last July to test-drive some '66 cars, he took time out to be briefed on how to drive Chevy's new, experimental gas-turbine truck, the Turbo Titan III.

"To start it," Norbye reported, "you turn on the fuel supply and then turn the key, just as with a piston engine. The turbine comes to life, slowly at first, and then the compressor revs up to 20,000 r.p.m. and you're in business. Normal operating speed is 35,700."

With a payload of 55,000 pounds, Norbye noted, acceleration to 70 m.p.h. is slow, working through a six-speed Allison automatic transmission. You keep an eye on compressor speed going uphill, downshifting with the selector lever if it drops under 20,000. Output-shaft speed should not drop below 1,700. Like Ford's experimental turbine, Chevy's has luxury touches—such as stereo radio.

**Auto Editor Norbye** tries out the plush driver's seat. Small, spool-like wheels used for steering resemble Ford's experimental Wrist Twist [PS, Apr. '65].

Urheberrechtlich geschütztes Material

**The cave's tortuously narrow passages gave way to a large chamber and a high cliff. At the bottom lay the "victim" . . .**

# HOW THEY RESCUED ME 200 FEET UNDERGROUND

**By James R. Berry** ILLUSTRATED BY RAY PIOCH

A MUSTY smell of wet clay permeated the huge cave chamber, and from one of dozens of tiny side passages a slow, methodical drip of water seemed to ring through the stillness like the blows of a hammer. The most surprising thing, though, was the cold. Before my "fall" down the 40-foot-high underground cliff, I had been warm from crawling down the cave's narrow passages and climbing through its rooms. Now, lying quietly on the damp floor at the cliff's bottom, my breath steamed and a chill from the floor penetrated my clothes.

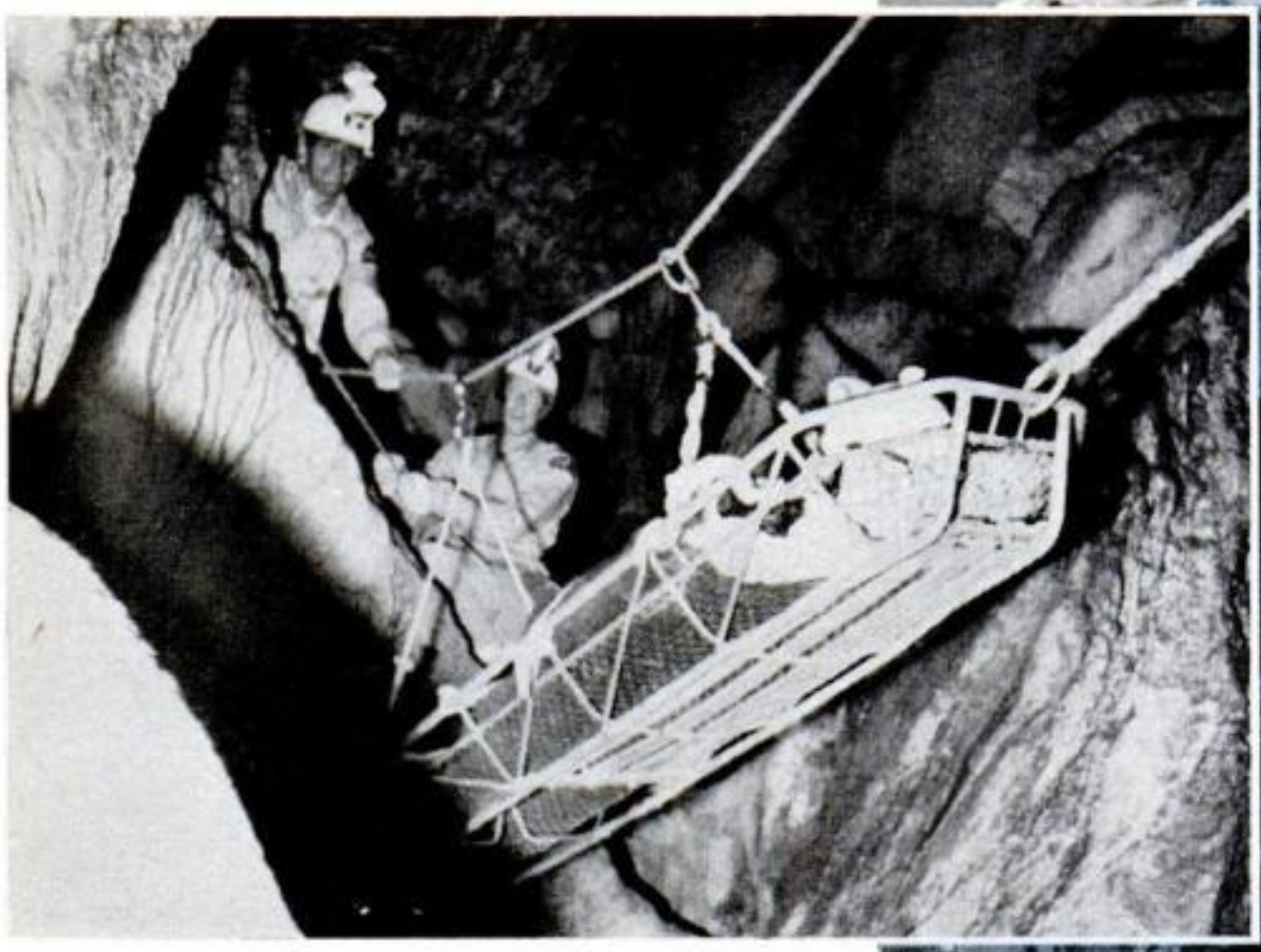
Suddenly, the oppressive blackness of the chamber was broken by the feeble rays of carbide lamps on the ledge high above me. The blinding rays of a flashlight swept over me, and I heard the sound of falling pebbles as someone began to descend to the cave floor. It was Bill Karras, leader of the National Capital Grotto Rescue Team—the nation's crack underground rescue squad. I relaxed. Help had arrived.

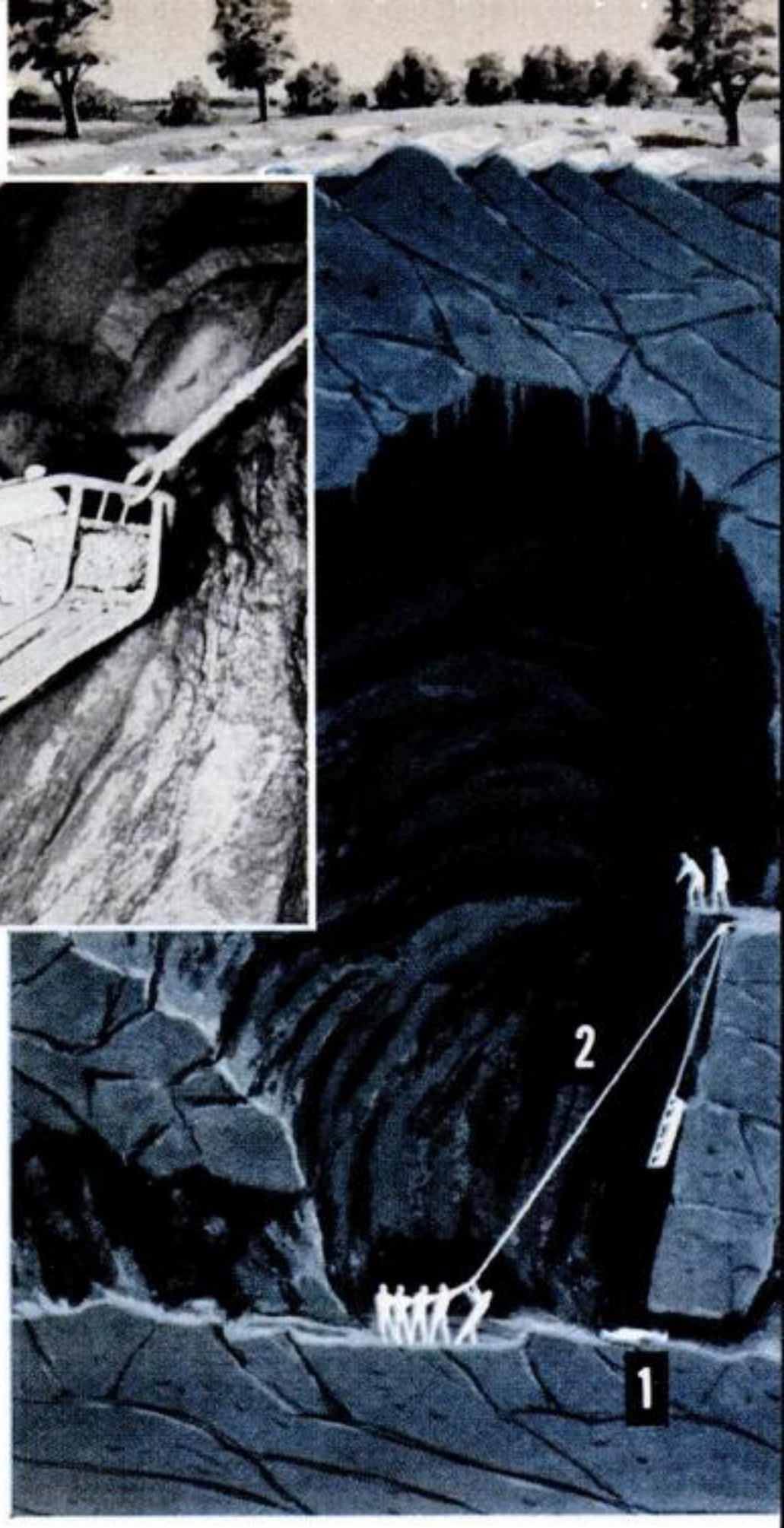
***Keeping a team on its toes.*** This rescue, like others each year, was a simulated exercise. My injuries were sham, arranged by fellow cavers who reported my plight. But except for Karras, none of the rescue team knew this was a practice problem. To them I was a greenhorn in trouble.

CONTINUED 89

Urheberrechtlich geschütztes Material

## Tied in a stretcher, I dangled perilously in the black void






**Snug in cradle-like stretcher** for trip across 50-foot chamber (above), author Berry is in hands of Bill Karras, leader of rescue team, and Lee Miles, rescue trainee. Drawing, right, shows layout of West Virginia cave where "accident" was staged by Grotto (cavers' club) of American University, Washington, D.C., as practice exercise for National Capital Grotto Rescue Team. Berry, assisted by members of AU Grotto, was placed at point 1, simulating an underground fall. Basket stretcher was hoisted up cliff (2), carried up passageway (3), then trolleyed across almost impassable chamber (4). Other problem was tiny entrance chamber (5). Group emerged —tired but successful—at 6.

Photograph inset at far right shows one of the tiny holes through which the stretcher had to pass to reach the entrance of the cave.

John Thydony, a high-school student and an expert first-aid man, diagnosed my imaginary back pains as possible internal injuries, my imaginary leg pains as a fracture. With my "fractured" leg in a splint (courtesy of my rescuers), I could have helped the team by hobbling, but internal injuries made me a stretcher case.

By the time I was strapped in, arms pinned to my sides, other team members had rigged a block and tackle at the top of the fall. Now Karras, Thydony, and four other cavers hoisted me up the almost vertical face of the 40-foot precipice.

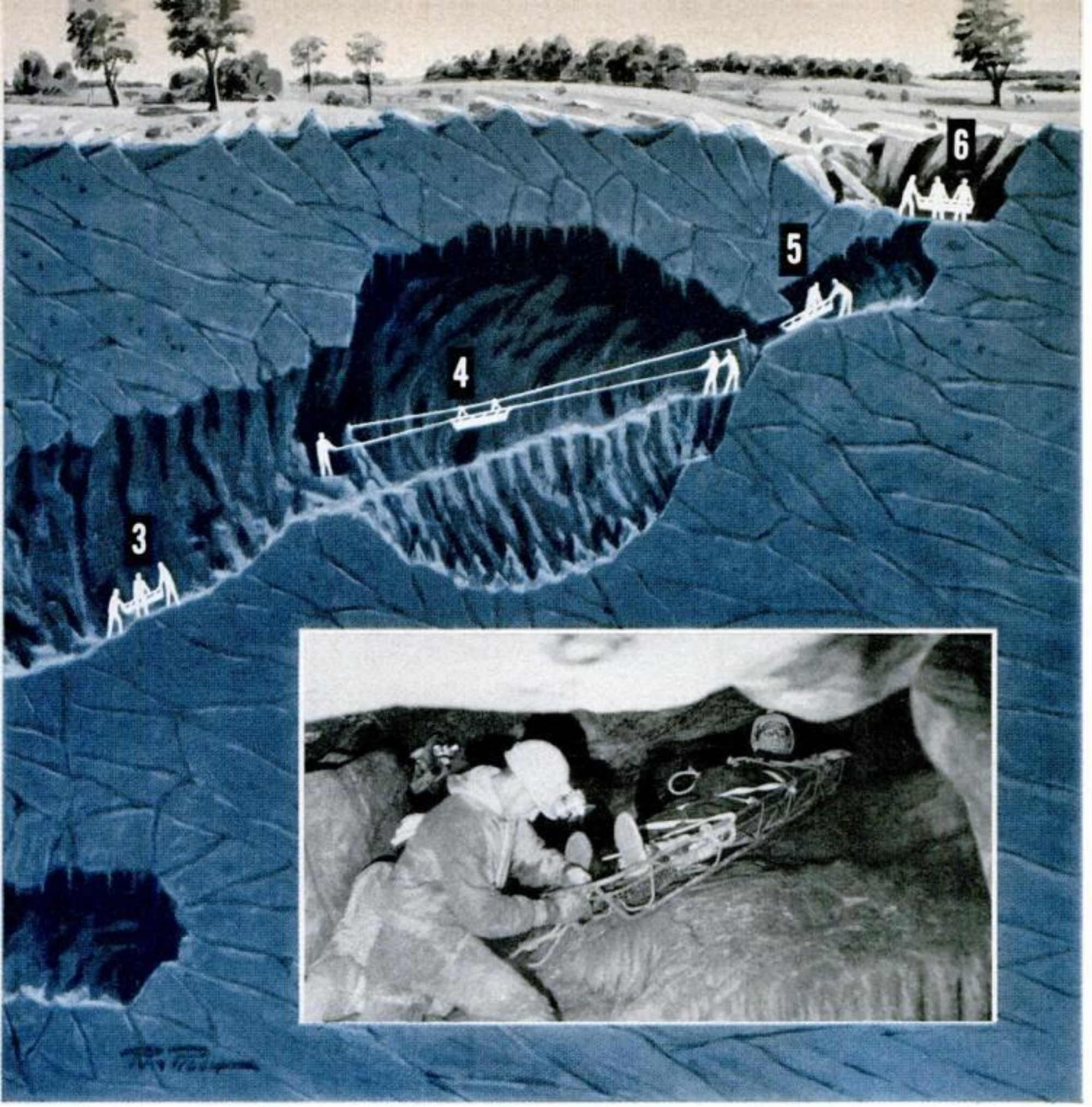
As the stretcher inched upwards, the carbide lamps below receded into pinpoints of light that threw shadowy figures on the cave's walls. For a fleeting moment I had the eerie feeling that I was alone, hanging helplessly in a giant black void.

***"We've got you."*** As I heard these words, hands clamped around the stretcher's steel rim. I breathed a sigh of relief as I was pulled onto the ledge.

A narrow passageway led from the cliff to a chamber 50 feet high that tapered toward the bottom. The narrowest point was three feet wide and ran the length of the chamber; below it was a jagged jungle of rocks. To cross the chamber, you'd have to put your back against one side of the split and your legs against the other and—crablike—scuttle across. But a stretcher? It looked impossible.



Urheberrechtlich geschütztes Material




Quickly three men rigged a trolley line, a rope tautly stretched 50 feet from one side of the chamber to the other, well above the cleft. Karras tied ropes across both ends of the stretcher, then slipped a caribiner—a large metal link with a cut in one side—on each rope. The stretcher was lifted up and the caribiners slipped onto the trolley line, and moments later I was being pulled across the gaping canyon.

Soon the stretcher was coaxed through a hole as small as a cellar window and into the cave's entrance chamber. Nothing ever looked as good as the patch of sunlit sky I spotted 12 feet above me. Five minutes more of barked commands and I was *out*, feeling a bit shaky, and sweating in the sun.

***The beginning.*** Paradoxically, it was a mountaineering accident that spurred the rescue team's formation two years ago. Members of the National Capital Grotto were in West Virginia to practice climbing a 900-foot-high column of rocks. Mounting a steep trail, they heard the roar of falling rock. One of the cavers was caught in the landslide, his leg crushed and an artery torn open. The other cavers stopped the bleeding, lowered the man down 400 feet of sheer cliff, and rushed him to the hospital.

"Coming home, we asked ourselves what would happen in an underground accident," Karras relates. "Underground exploring is a very specialized form of caving, yet there

[*Continued on page 204*]

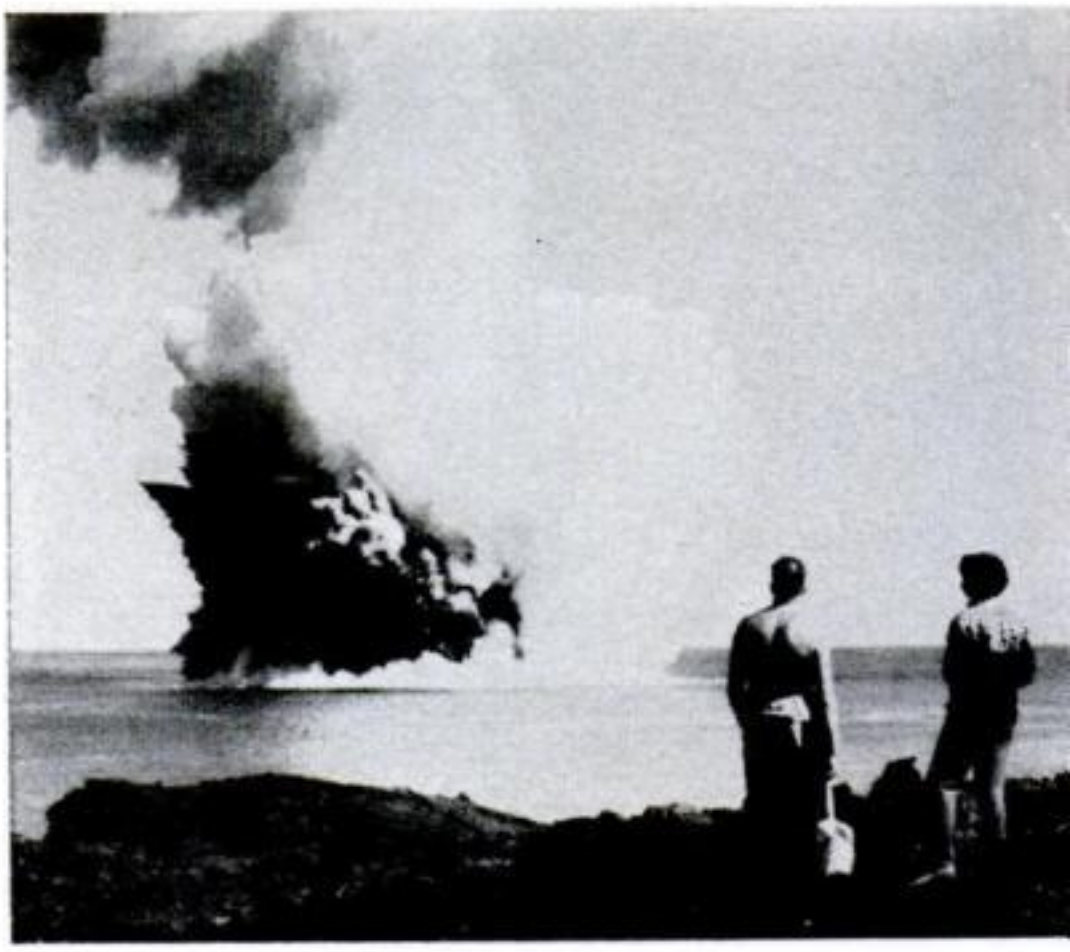


Urheberrechtlich geschütztes Material

# Fiery birth of a new island

**Surtsey's volcano** is still active, but lava flow has stopped. Dark spot at lower left is trapped seawater that formed a lake when island rose.

**Scientists approach** smoking new island. Surtsey, just north, can be seen behind it.



**Standing on Surtsey's shore,** scientists watch the awesome power of new island's volcano.

SPOUTING fire and smoke thousands of feet high, an undersea volcano blasted itself above the surface of the stormy Atlantic last summer to form a new island just below Iceland.

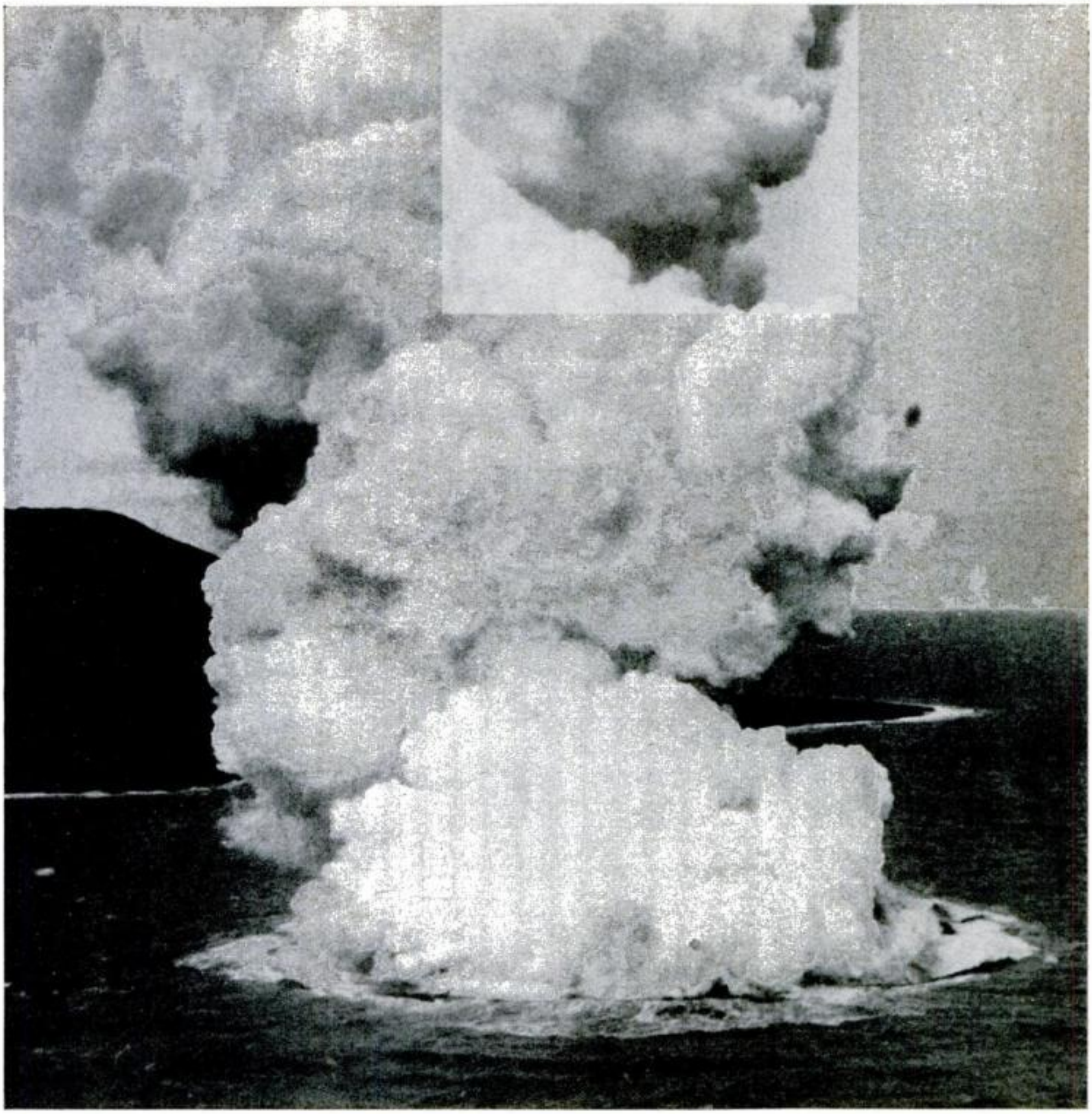
The new speck of land is located about a quarter-mile south of Surtsey, another volcanic island which was born two years ago (see map above). The two islands are close enough to become a single land mass in the future, geologists believe.

As Surtsey pushed up from the ocean bottom, its volcano hurled giant lava bombs a half-mile into the sea. A plume of smoke rose 50,000 feet high. Ashes and cinders were blown 1,500 feet in the air in a continuous eruption. Red-hot streams of lava began flowing from the crater about five months after the island appeared—about 180,000 tons an hour.

Surtsey was still puffing furiously when I flew over it in a Navy plane just before its neighbor was born. Molten lava was still oozing from its 570-foot-high crater, down across the craggy island to the sea, creating great columns of steam.



Urheberrechtlich geschütztes Material



**Still rising,** the unnamed new island is violently erupting. Scientists believe the eruptions will eventually close the gap between Surtsey, in background, and the new island.

As the lava hardens, it covers the soft ash and cinders that form the base of the two-mile island with a protective mantle. Without this protection, Surtsey would soon be pulverized by the violent seas and disappear almost as quickly as it was born. With its lava mantle, Surtsey should withstand the ravages of the ocean for many hundreds of years.

The new islands have attracted over 100 scientists, who are studying every phase of their development. Sponsored by the U.S. Office of Naval Research, the scientists are studying formation of volcanoes, tornadoes, and lightning (generated by the billowing clouds of ashes).

They are also studying the order in which plants and animals take hold on the two new islands.

They theorize that if the first plants appear on high ground, the wind will have borne the seeds there. If plants first appear on the islands' coasts, seeds will have been floated ashore. If plants appear first beside nesting sites, birds may be considered the planters.—*Herbert Shuldiner.*

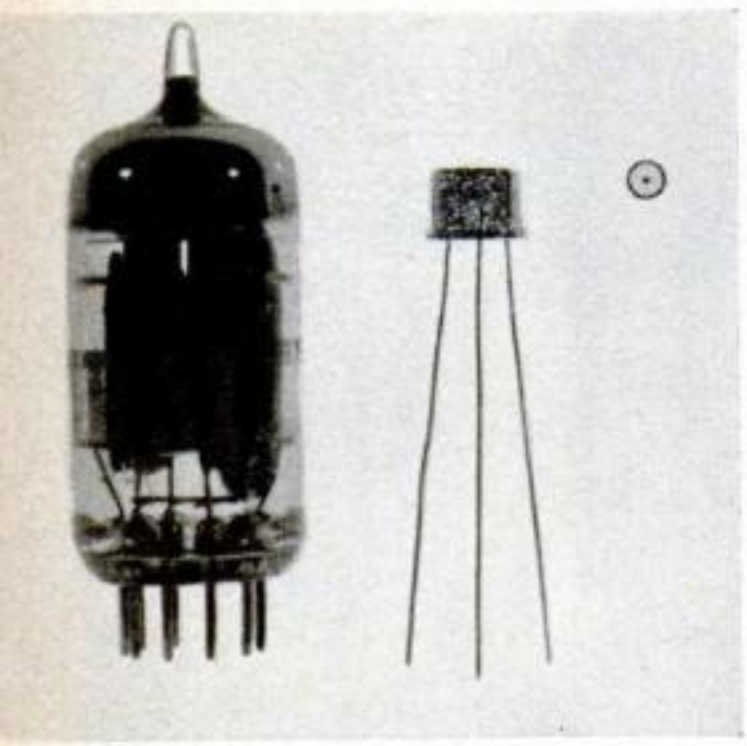


Urheberrechtlich geschütztes Material

# Tiny Computers Steer Mightiest Rockets

**Amazing advances in microelectronics shrink the weight and size of the guidance system for a craft like our moonbound Saturn V rocket—and enhance its reliability in the bargain**

**By Dr. Wernher von Braun** Director of NASA's George C. Marshall Space Flight Center, Huntsville, Ala.



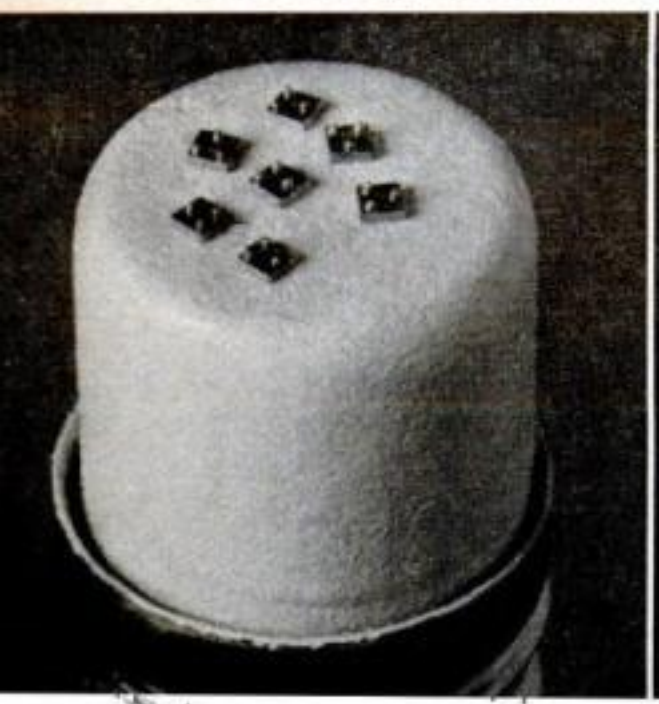
**How they compare:** Left to right are vacuum tube, transistor that serves same purpose in transistor radio, and chip transistor or "unit logic device" (speck within circle) used in computer for rocket.

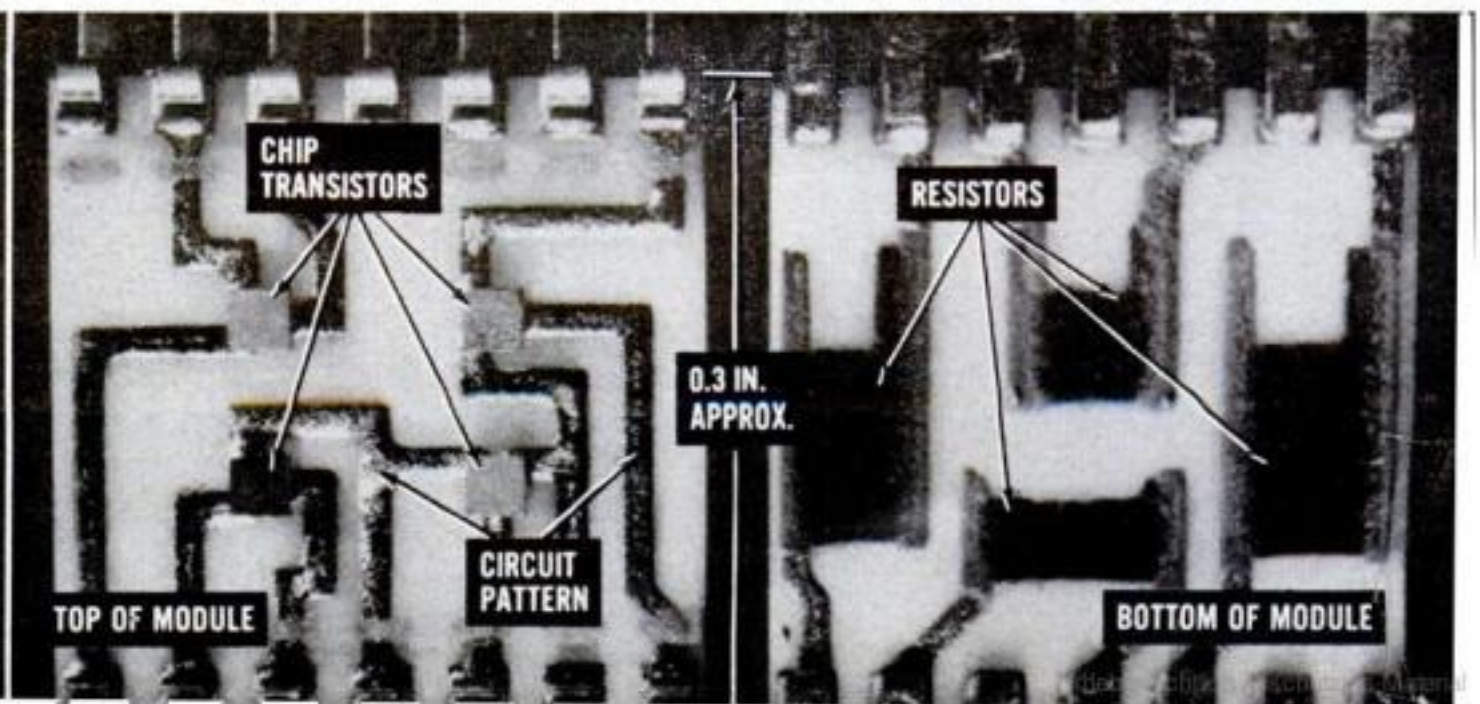
DRAMATIC progress in the miniaturization of electronic equipment is, without doubt, one of the most important reasons for the rapid advances in rocket and space-flight technology in recent years.

Of course, manned orbital flights would not have become possible without the great strides made in rocket propulsion, new materials, new structural-design methods, advanced hydraulic systems, high-precision gyroscopes, and in other fields. But without the recent contributions of solid-state physics and the resulting technology of microelectronics, most of our achievements in space, whether with manned or unmanned vehicles, could not have come about.

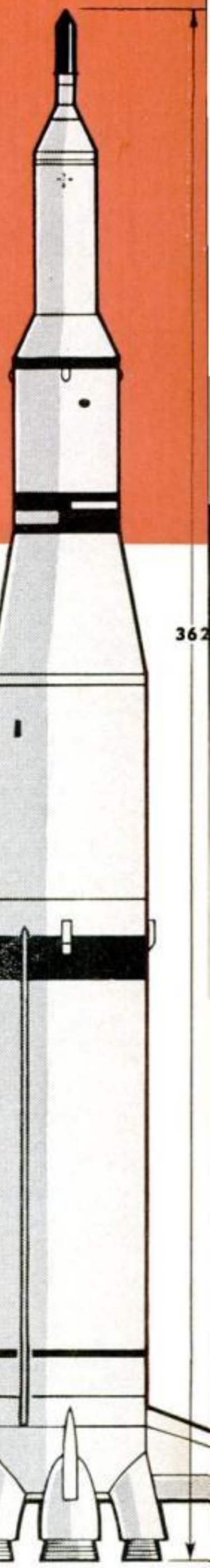
The accompanying pictures tell, better than words, how far the art of miniaturizing electronic components has come. From the vacuum tube, progress has led to the kind of transistor in a transistor radio—and thence, in turn, to the near-microscopic chip transistor or "unit logic device." Many thousands of these ULD chip transistors

**Seven chip transistors** dot tip of pencil eraser (below, left). Next two views, also highly magnified, show top and bottom of typical IBM module incorporating these "ULD" chips in a microelectronic circuit. Thirty-five of these modules make up a pluggable "page" (view at bottom of opposite page), and 150 such pages go into a rocket's guidance equipment.





Dr. **von Braun**, left center, tours Manned Spacecraft Center at Houston, Tex., with two of its staff and, far right, astronaut D. K. Slayton.





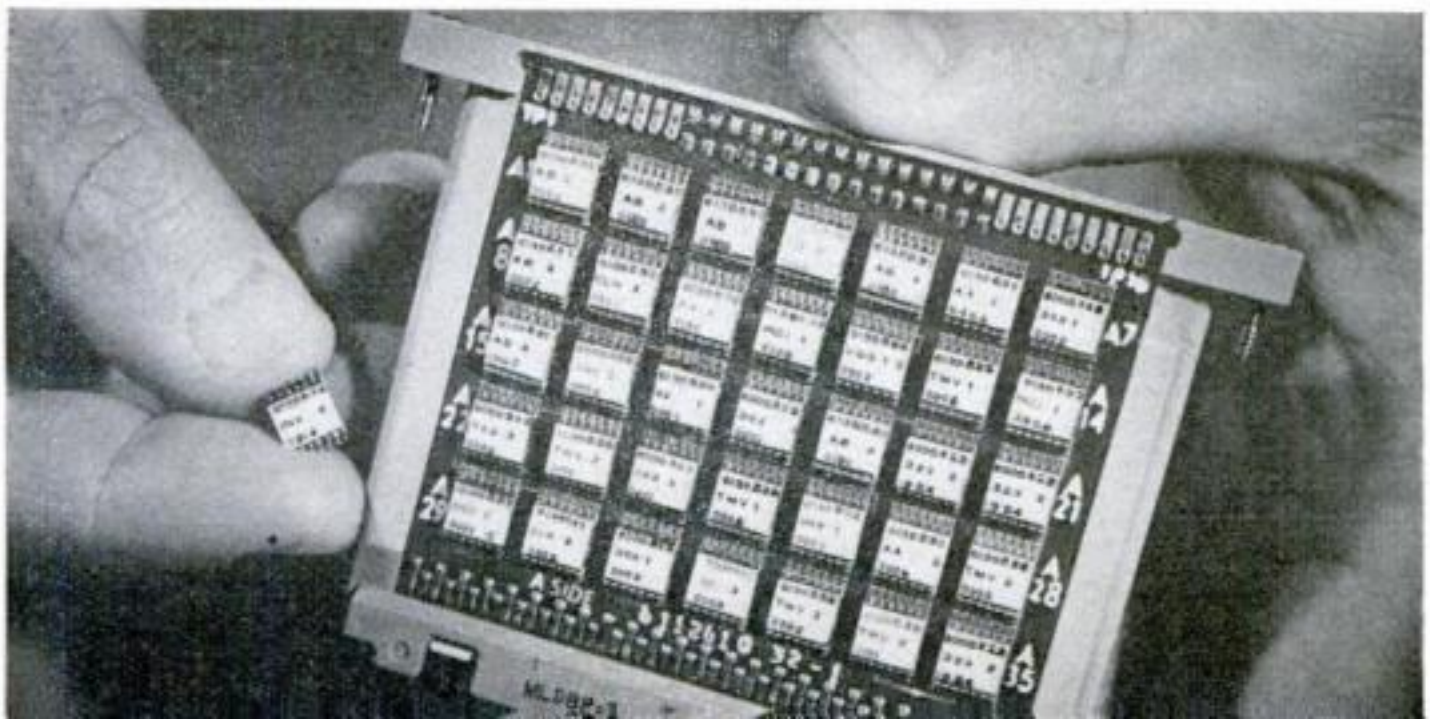
are used in the microelectronic circuits of the guidance computer that IBM is developing for the Saturn V moon rocket.

Shown in the pictures (facing page) is a typical ULD module about 3/10 of an inch square, in which IBM incorporates the chip transistors. They are the squares attached at junctions to the circuit pattern on the top surface of the module. Dark areas, seen on the bottom surface only, are resistors formed by a screen-printing process and then trimmed to the desired resistance. Thirty-five of the modules make up a pluggable "page," and the guidance equipment employs 150 such pages.

***Saturn V's guidance computer.*** The savings in weight and size of an electronic computer based on these design principles are amazing. The Saturn V guidance computer, together with its companion data adapter (which serves as a link between the computer and all other elements of the guidance system), has 80,000 components. It can perform 9,600 operations a second. Its magnetic-core memory has a storage capacity of 460,000 bits (memory elements). Yet the two boxes weigh

[*Continued on page 206*]

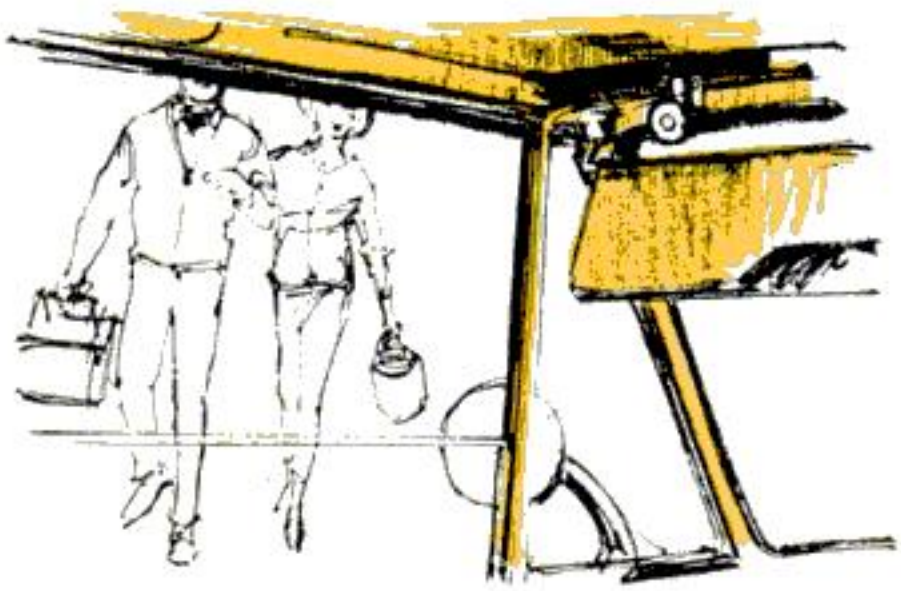
For the gigantic Saturn V moon rocket (compared with size of man in NASA drawing at far right), the resulting computer and its companion data adapter occupy two boxes totaling only 5½ cubic feet in volume, 267 pounds in weight, and 438 watts in power required.



Urheberrechtlich geschütztes Material

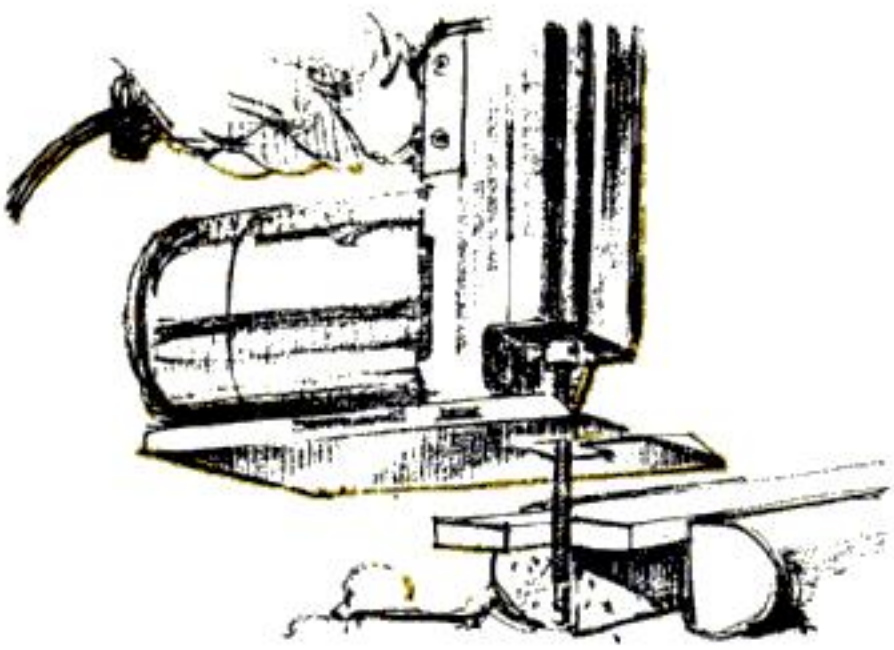
# "I'd like to see them make..."

**An aluminum backpack frame** with hinged and telescoping legs to form a table. For traveling, the snap-on "top" would become a base to support your baggage.—*Richard Ham, Woodland Hills, Calif.*



**Less balky convertible tops** with clamps like porthole dogs. After locking the clamps, you could pull the top taut by turning the knobs. —*Pfc J. P. Rowinski, Fort Hancock, N.J.*

**Fountain trowels** for cement work. Hook one up to a garden hose and a pushbutton release on the hollow handle would start or stop a flow of water.—*Les Richardson, Jamestown, N.D.*



**A dual-use saber saw** with a small metal file interchangeable with the blade. The saw's reciprocal action would give perfect filing in corners or tight spots.—*John Woodward, NYC.*

**Self-locking windows** with a catch on the jamb. As you pulled the window down, it would engage the lock, which would automatically secure the window in place.—*Jim Cohen, Lafayette, Ind.*

Everyone has his own pet idea of a gadget that he would like to see in general use. What's *yours?* We will pay $5 for each one published. Please use Government postcards only. Send to ILTS Editor, Popular Science, 355 Lexington Ave., NYC 10017. Write your name and address clearly. Contributions cannot be acknowledged or returned.

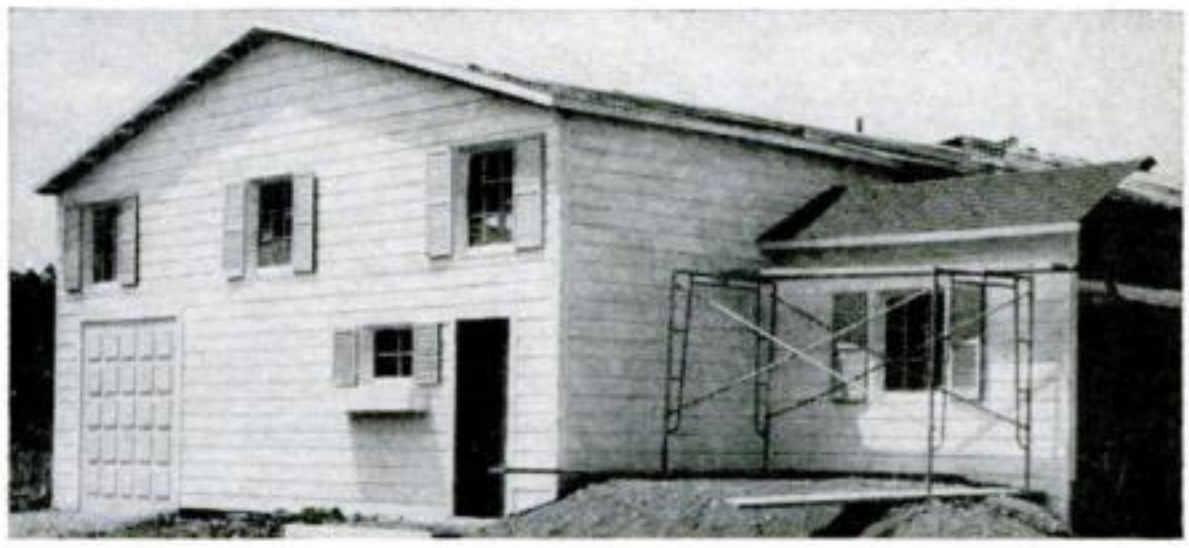
# House is built only to go up in smoke

Old turkey barn ready for brief but picturesque new life.

Needing to illustrate an advertisement for a fire-insurance account, a New York ad agency had to settle for an ancient turkey barn that was scheduled to be razed to make room for a suburban industrial park in nearby Millbrook, N. Y.

The agency's art director first had the old barn's face lifted by having carpenters add a new facade at one end to make it look like a contemporary split-level home. Then he called in landscapers for shrubbery, and finally photographers and the firemen.

All went well with the blaze. Churchgoers were treated to a spectacular Sunday-morning fire, the agency got its picture, the town's land was cleared, and the Millbrook fire department got practice and a check for new equipment.



One end has face lifted to look like a modern split-level.

Shrubbery in place, barn has its moment of blazing glory.

## Plastic seaweed to halt beach erosion

With many feet of sand lost by erosion, resorts like New Jersey's Island Beach State Park and Britain's Bournemouth are using plastic seaweed. Weighted clumps are spaced a yard apart along parallel ropes to form a net 100 yards square, then submerged 300 yards off shore where they won't interfere with swimmers. It's a Danish idea, based on observations that beaches with natural seaweed hold their sand in spite of waves and tides, catching floating grains and dropping them down again.

Workmen at left make rope network of tufts of plastic fibers (right), then tow them out to sea.



Urheberrechtlich geschütztes Material

**You'll travel legally at whirlwind speeds on unique new roads built like runways**

# How Fast Will

By E. D. Fales Jr. ILLUSTRATED BY LLOYD P. BIRMINGHAM

YOU drive to the outskirts of town, come to an ultra-modern tollgate structure marked "Century Expressway." You climb a ramp, press the throttle hard. On your right, other cars are moving at 70 and 80 miles an hour.

The wind whistle increases. Your speedometer goes right up past 80 and keeps going: 90, 95, 99 . . . The other cars fade far behind.

A voice override breaks into your radio program: "Welcome to the Century Expressway."

A 500-mile stretch of wide, clean "runway" opens ahead of you. You're driving America's first "speed road"—built for travel at up to 150 m.p.h.

No dream, the first Century may well be ready for your car within a dozen years, perhaps sooner. I have seen the thick initial proposals at the Department of Commerce in Washington. It is *not* to be an automated highway of the far-out type. It's basically for today's cars and today's drivers. The engineers who proposed it have bypassed automation (all that will come later). But you will be in constant radio contact (like a plane) with passing control towers. And you may also, like a plane, be in radio touch with nearby cars.

### First Century to Link Boston and Washington

The first Century Expressway, which may soon be followed by others, has been proposed for construction between Boston and Washington, D.C. The design was born in a study made for the Commerce Department, which is worried about growing traffic congestion in the Northeast.

Behind the idea are the hard-headed engineers of the great Cornell Aeronautical Laboratories at Buffalo, N.Y. And behind *them* is a distinguished national advisory group of still other engineers and experts.

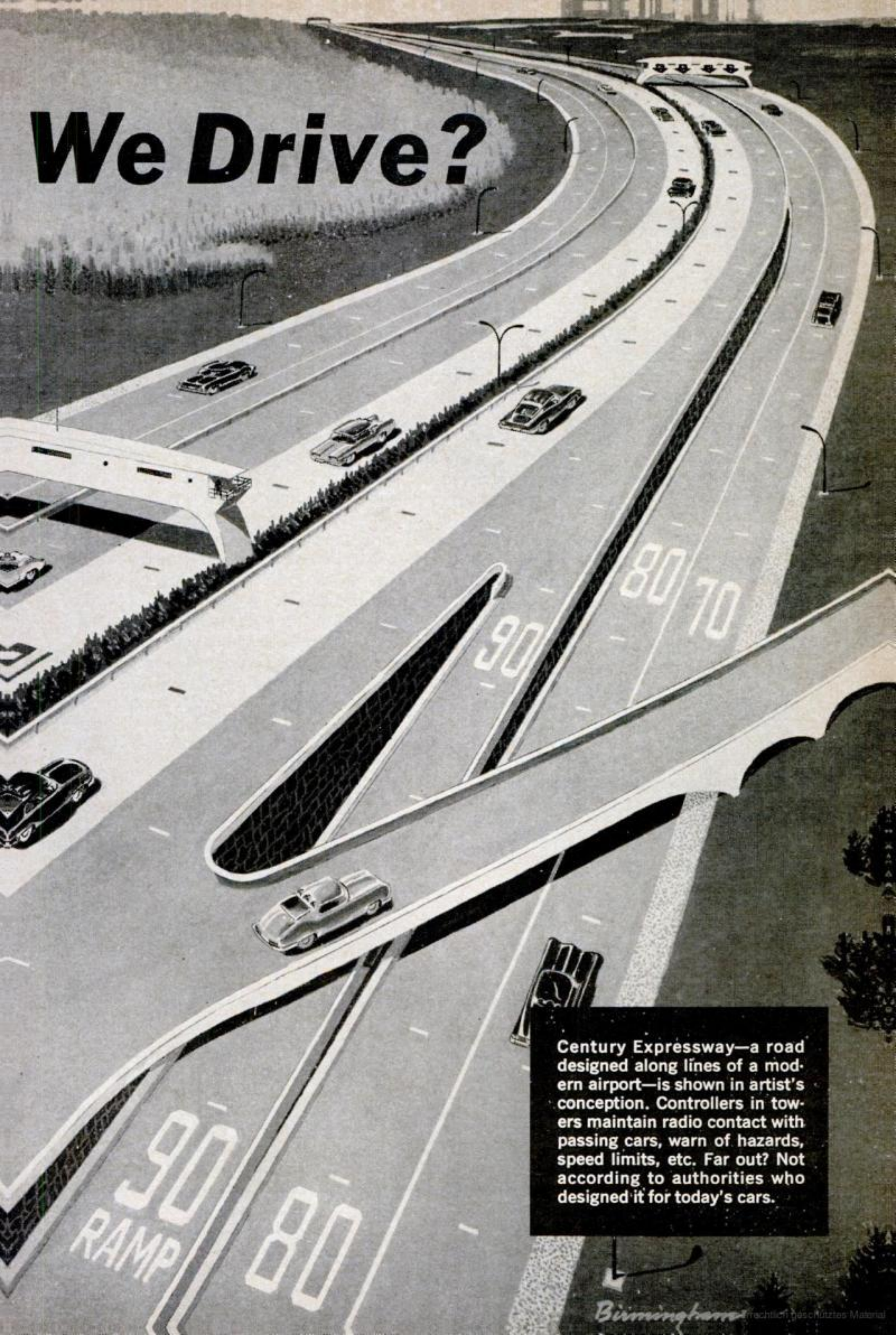
Also closely interested is the United States Congress. Recently, Congress asked the U.S. Bureau of Public Roads to get an answer to this question: *In 1972 (just seven years from now) we will complete the present 41,000-mile system of super-roads known as the Interstate System. After 1972—what do we build?*

The Century Expressway may well be the answer.

For in spite of accidents, speeds seem to be going up and

CONTINUED

# We Drive?




Century Expressway—a road designed along lines of a modern airport—is shown in artist's conception. Controllers in towers maintain radio contact with passing cars, warn of hazards, speed limits, etc. Far out? Not according to authorities who designed it for today's cars.

Birmingham

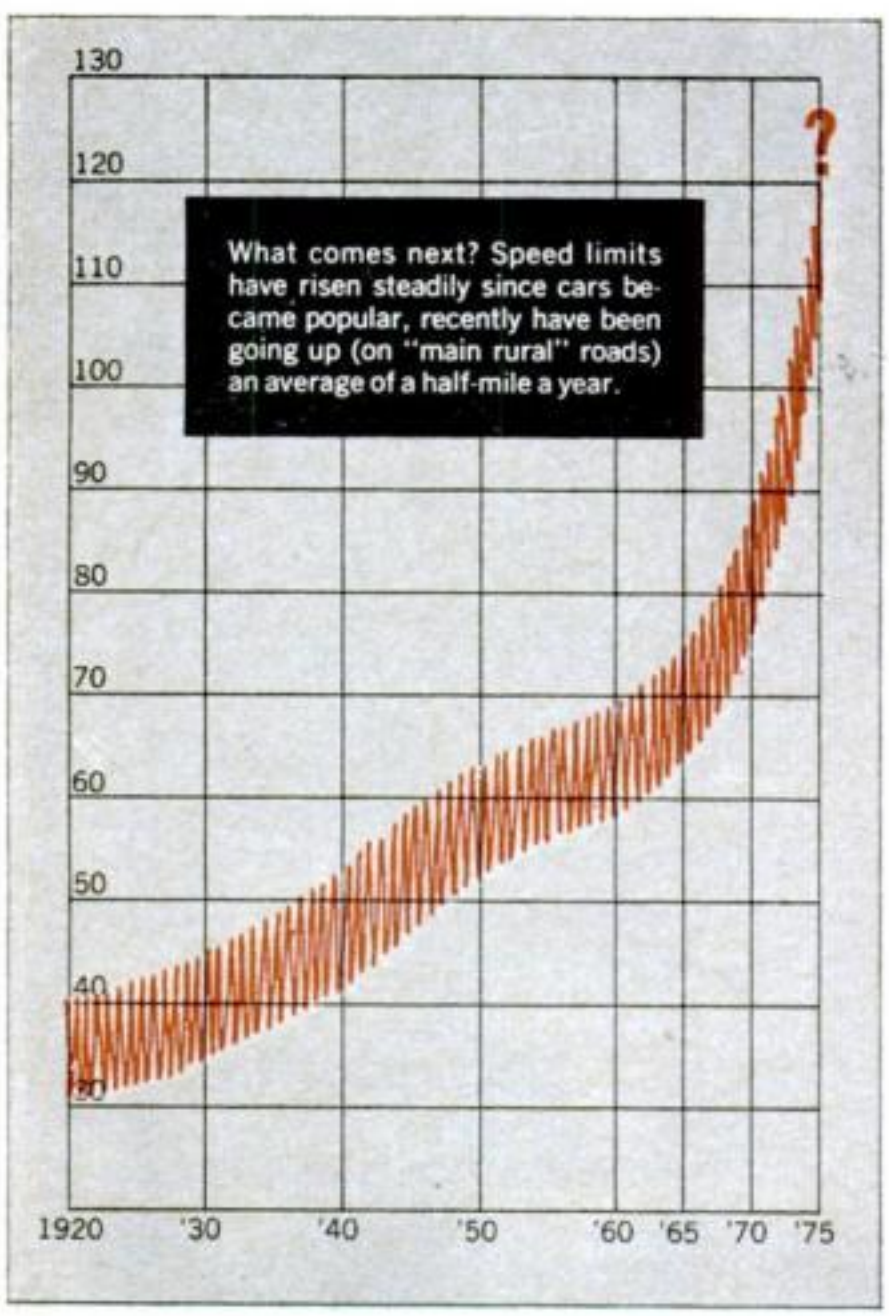
Rechtlich geschütztes Material

up. Twenty states now have 70-m.p.h. limits. Five have 75-m.p.h. limits—on certain roads. Within 10 years, perhaps in five, some engineers look for 90-m.p.h. postings. The Century is the next step.

After consultation with Detroit car builders, Cornell has proposed an exciting approach to traffic: a virtual long-distance *runway* for cars. Two lanes at the right will carry "normal" 70- and 80-m.p.h. traffic. Separated from these by a barrier will be the speed lanes. These may have a 100-m.p.h. limit at first, with a 120-m.p.h. top for passing. Later the limit may go up to 150.

The whole concept is a dramatic departure in more than one way: On the Century there will be no trucks. Engineers have found that slower truck speeds, noise, growing vehicle size—and just the mere presence of such giants among cars—bother drivers. And blasting through the "shock wind" of a truck doing 100 would be a real hazard.

**How speed-limit averages have gone up in the last 45 years**




Thus it is proposed to give trucks their own separate "Super Freightway" on which 400-, 600-, and perhaps even 1,000-hp. trucks—and truck trains 150 feet or longer—can run.

### How You'll Drive the Century

At first not *everyone* will drive it—even though it will be designed for cars pretty much like the one you drive today. Detroit has promised engines that will take you wherever you want to go at a steady 100 m.p.h. or more. But even with a dozen years of development, it is doubtful that all cars will stand a steady 100 m.p.h. So, before each run, yours will get a one-minute automatic checkup: A machine will have a good look at your tires and test your engine, steering, brakes, lights. If all is in order, you will be admitted to the 100-m.p.h. lane.

In addition, you may need a special license. No driver with a bad repeater's record will be accepted—for the Century will separate the men from the boys.

You will enter the Century at any major city. At the entrance point your radio also will be checked, for you will, like an airplane pilot, need voice (and even tone signal) communications along the way. You'll not only receive messages from control towers but you will also be talking to other drivers.

### A Voice Will Talk You On

Let's say you go through a terminal and then enter the high-speed lanes from a special parallel accelerating and mixing section.

If your radio is not on, it will come on automatically on the ramp. If you are listening to a football game, a voice-override may say sharply: "Accelerate to 90."

You come up off the ramp and begin to merge along a mixing lane, which gradually becomes an escape lane. This is a shoulder lane, but it's different from those you know: It's wide, flat, and fast—a real running lane.

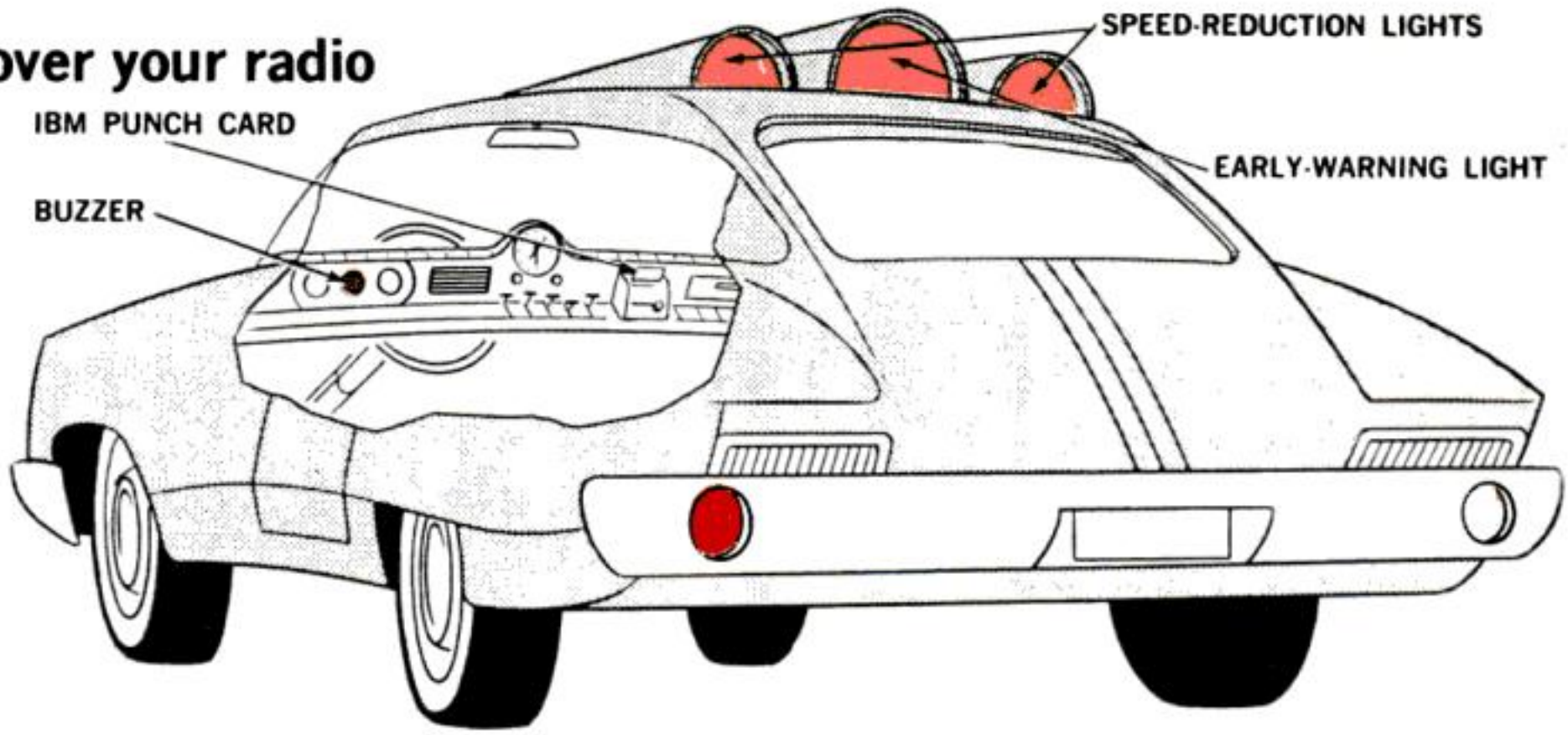
A voice now says: "Accelerate to 100. Merge to speed lane. You are cleared for 128 miles of cruising at 100 m.p.h. Maximum passing speed 120 if needed." Your foot feeds more gas and the car picks up: 95 . . . 97 . . . 99 . . .

You pull into the speed lane at 100. This merge is surprisingly easy because, on the



Urheberrechtlich geschütztes Material

## over your radio




**Early-warning light** (center) flashes when driver lifts foot from gas, turns solid red when he brakes. Amber lights flash if speed gets below 90. Light and buzzer (on dash) warn of slow car ahead. IBM punch card may also alert driver (by radio override) to exits and hazards.

Century, cars will all be moving at the same speed—except in emergencies and special cases when a sudden burst to 120 may be needed. Slow driving, speeding, and tailgating, detectable by electronic counters embedded at equal intervals in the road, will be out.

The speed track now unrolls before you like velvet. If you focus on the pavement just ahead you'll see only a blur. So you'll find yourself focusing much farther ahead—good practice, anyhow. When you do that, the blur disappears.

At first it's exciting. Then a mild monotony sets in. The curves are so gradual you scarcely realize you're turning, except now and then when you meet a curve around a mountain that requires high racetrack banking. Sight distances are enormous—surely no less than half a mile. There's no worry, of the kind on today's 70-m.p.h. roads, about boxes and debris fallen from trucks, since all cargo carriers will be over on the Freightway.

Although the engineers would like you to drive only 170 feet behind other cars (engineers always want to pack you closer in traffic than is good for you), you may find yourself dropping back 400 feet or more for comfortable vision and emergency "escape."

On the roof of the car ahead, you notice a big central red light and two smaller yellow lamps—where tail lamps *should* be so you can see them. The lights are standard equipment on all cars traveling the Century. Suddenly the big central red light starts to flash. This is an "early warning" alert for nonbraking deceleration. Something is wrong; he has eased his foot off the gas. (You may also hear a warning tone signal in your radio.)

You cut speed. At the same time a flasher on *your* roof warns cars behind you. As soon as the speed of the car ahead drops to 90, both yellow lights on his roof also start flashing urgently. Suddenly the center light on the car in trouble turns solid red. He's braking.

A radio tone from your car now may warn him of your approach. Or you may say, into a throat mike, "I am going to pass on your left."

"Okay," he replies. "I have an overheated engine." He pulls into the escape lane.

You now notice that control lights over the escape lane turn red. (Over your lane they remain green.) He has radioed word of his trouble and the escape lane is being closed to protect him.

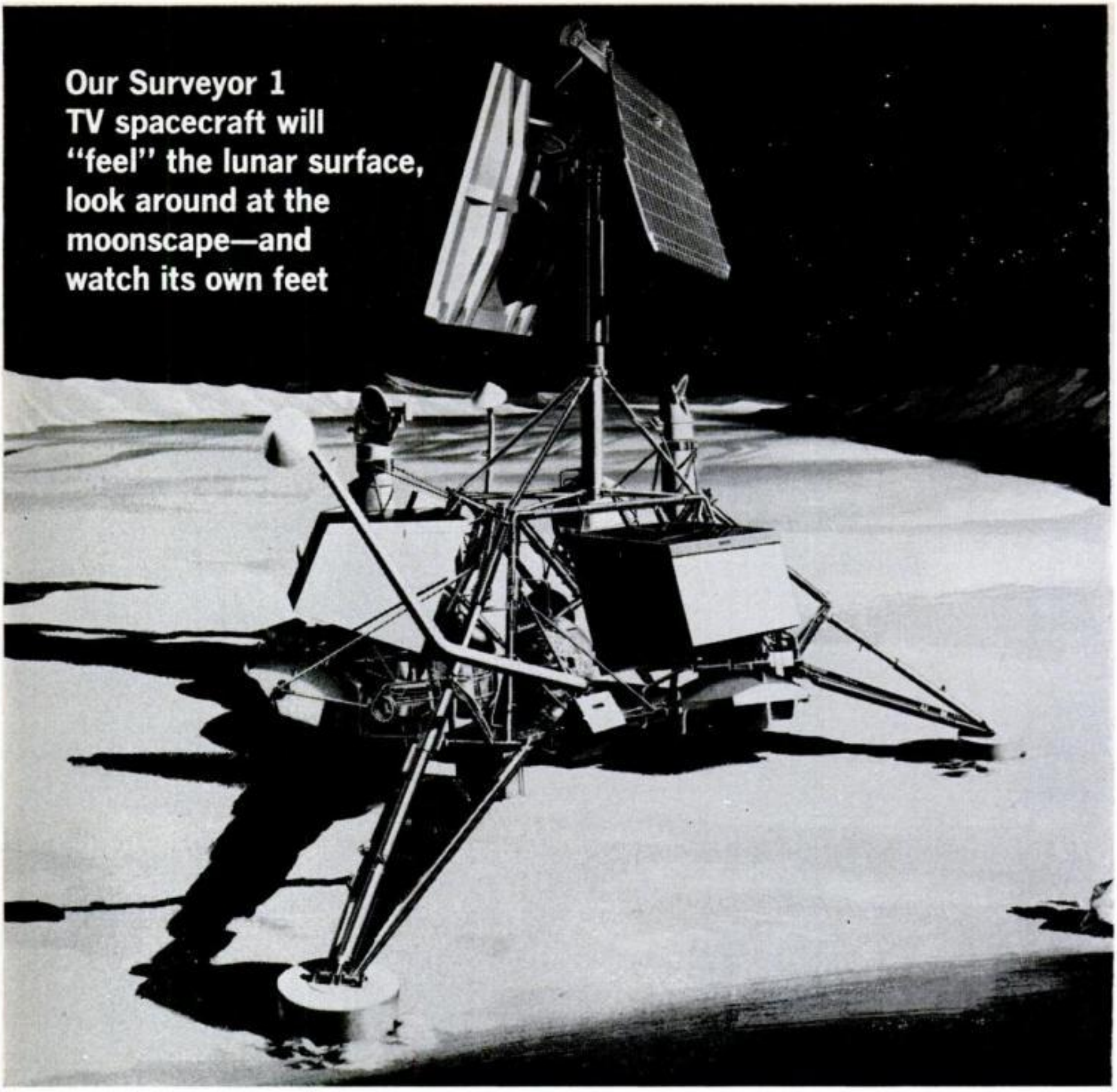
A short time later you arrive on the outskirts of a large city, and a calm voice tells you to "watch for traffic entering on your right." One or two cars enter from a mix ramp on your right. No problems. Then, suddenly, clouds appear in the sky ahead and you see flashes of lightning. At high speeds your tires may hydroplane in rain, yet you're not supposed to slow down. What now?

Moments later a new voice says, "You are cleared for eight miles at 100 m.p.h. A storm is developing. Stay alert for advisory."

[*Continued on page 186*]



Urheberrechtlich geschütztes Material




# *Now we're trying a* Soft Landing

**By Wesley S. Griswold**

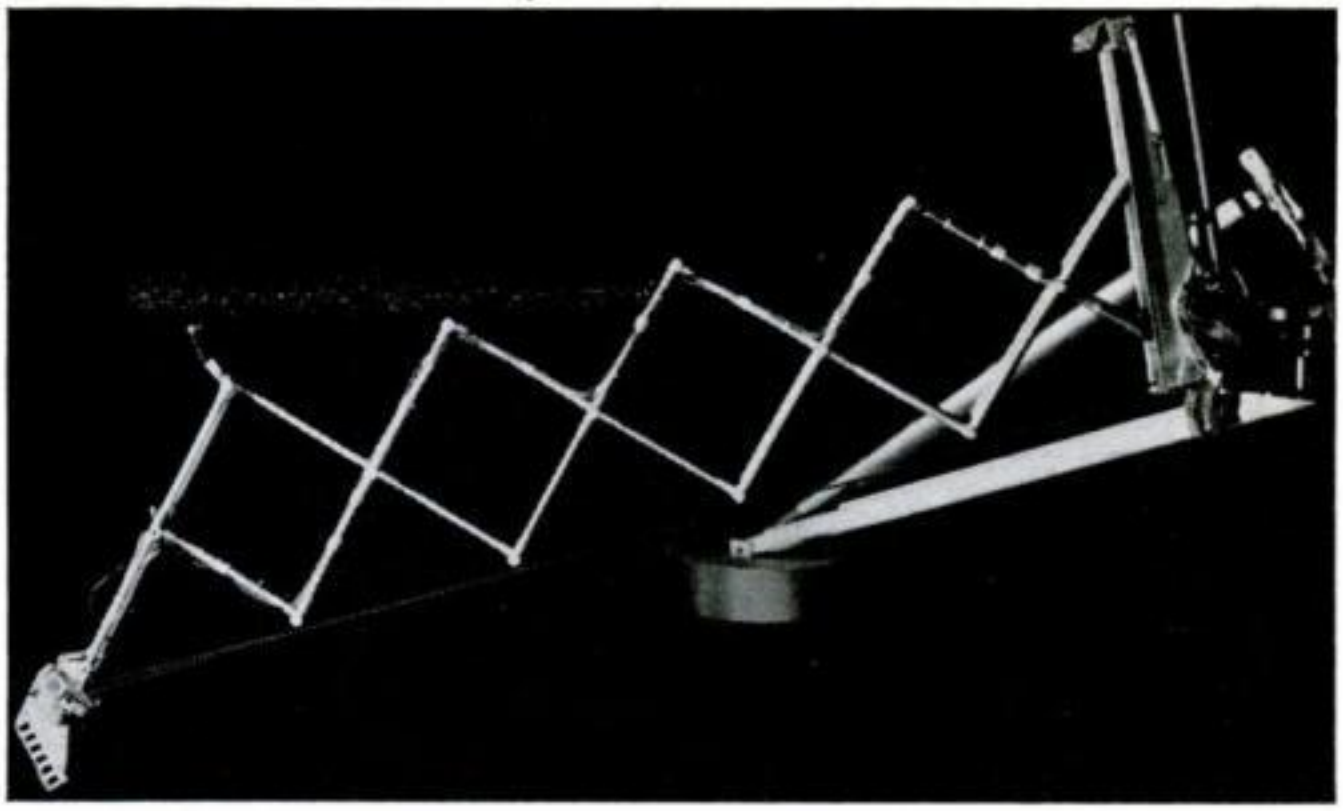
WITHIN a few weeks—after the most intricate U.S. space shot yet attempted—we may obtain our first really dependable clues as to whether the moon is safe for men to land on.

That crucial question remains unanswered despite 17,259 remarkably clear close-up photographs of our natural satellite taken by Rangers 7, 8, and 9. Scientists don't agree on what the pictures reveal. We still can't tell whether the moon's surface is hard and unyielding, a vast dustbin, or a mixture of both textures.

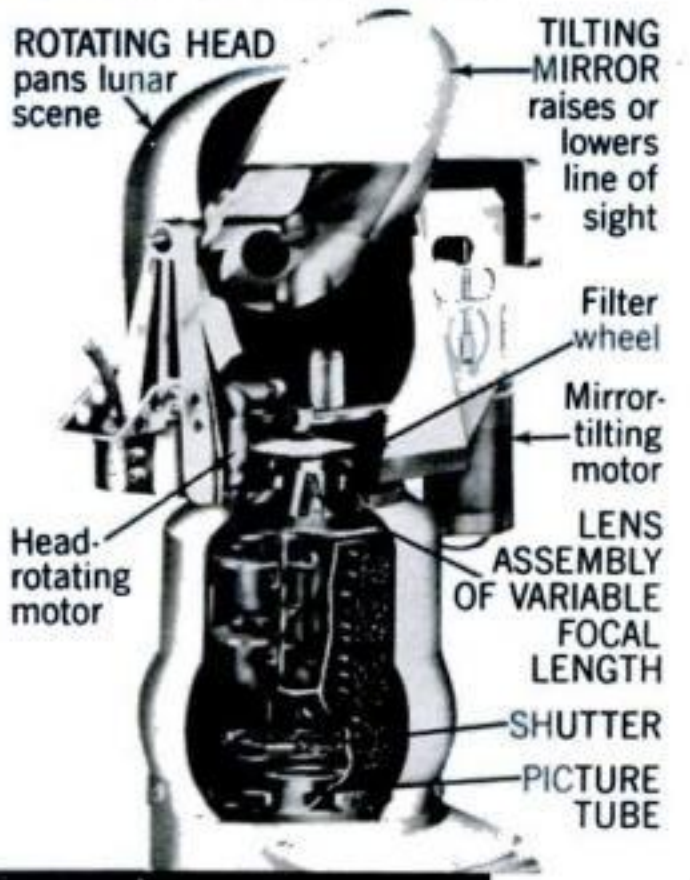
Now we're sending a robot to find out for sure. Surveyor 1, pioneer lunar explorer (unless the Russians, after recent unsuccessful attempts, manage to beat us to it), is scheduled shortly to set down its three saucer-shaped feet on the moon's surface in a "soft landing" at low speed. It is then



Urheberrechtlich geschütztes Material



**Digging little trenches** with this miniature scoop, on Surveyor No. 5 and later ones, will tell whether the moon's surface is soft or hard.




**Surveyor,** after soft landing (drawing, far left), looks over surface of moon. First ones will do so with one "survey" TV camera (inset at left); later ones with two. Photo of Surveyor 1 model (right) identifies some principal parts. Spacecraft stands 10 feet high; its legs spread 12 feet across.

# on the Moon

expected to take TV pictures of its surroundings, a full-circle panorama—and of its feet, if they haven't sunk out of sight. The instrumented feet themselves will meanwhile have reported by radio telemetry on the "feel" of the landing impact they experienced, thus providing at least crude information about the moon's hardness, slope, and friction.

***The spraddle-legged lunarpod.*** Surveyor, which weighs about 2,200 pounds, resembles a giant tripod. It is 10 feet high, with solar panel and plate-shaped directional antenna mounted back-to-back at the tip of its mast. Its flexible legs spread 12 feet apart. Even if Surveyor should land on uneven terrain, it won't easily tip over.

Surveyor will scan the lunar surface with a "survey" TV camera mounted midway between its feet and mast tip. Mirrors enable the camera not only to look out horizontally and gaze 20 degrees upward, but also to

CONTINUED 

Urheberrechtlich geschütztes Material

## Boosting Surveyor's weight to the moon will take the might

peer down at Surveyor's feet. This last is especially important, since it will reveal how deep the feet stand in whatever material covers the moon's surface.

The survey camera can swivel 360 degrees. Its lens of variable focal length affords both wide- and narrow-angle fields of view. The instrument could transmit pictures to earth at the rate of one every 3.6 seconds, or 1,000 an hour; but regular interruptions in the flow of pictures will be necessary for battery recharging, and for lower-power telemetering of engineering data about the spacecraft's condition and the strains and temperatures to which it's subjected. If the first mission is close to ideal, Surveyor will have many hours of daylight in which to make its reports, before the two-week lunar night descends.

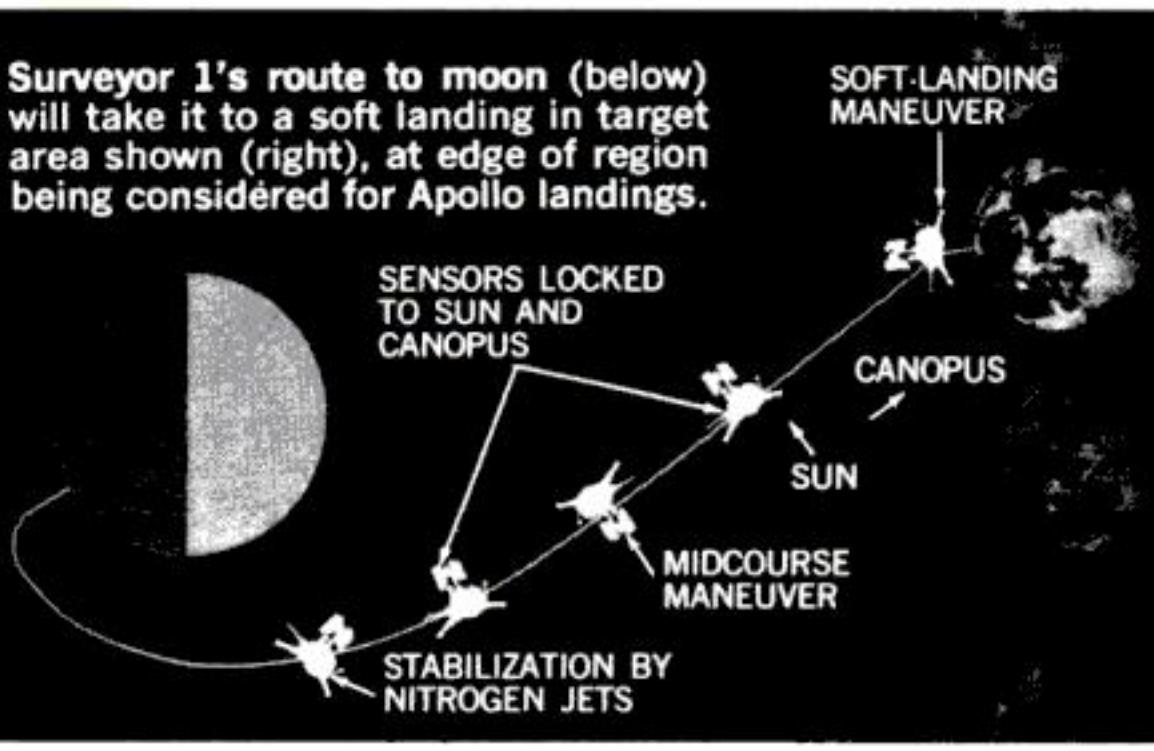
***Breaking out.*** When Surveyor heads moonward, it will be huddled like an embryo inside the tip of an Atlas-Centaur rocket. Sixty miles out, however, just before the burned-out booster drops away, Surveyor's shroud will be blown off. Surveyor will extend its legs and two omnidirectional antenna booms that look like some strange new periscope. The vehicle will then begin transmitting radio signals to enable the global stations of Jet Propulsion Laboratory's Deep Space Network to track it.

Right from the start, Surveyor's flight will differ from those of previous spacecraft. For the first time, the launch will be a direct one—omitting the parking orbit that has customarily preceded each space vehicle's final spurt away from earth's gravitational influence and the beginning of its headlong journey toward a cosmic target.

The primary reason for the change is Surveyor's weight, far greater than that of any predecessor. That unprecedented weight demanded the extra brawn of Atlas-Centaur, which burns liquid hydrogen in its second stage. But Atlas-Centaur, still under development, is a young rocket compared with the older but less powerful Atlas-Agena. The latter's restart capability enabled it to perform the parking-orbit maneuver with admirable dependability. The Atlas-Centaur likewise has restart capability, but this has not yet been as thoroughly tested—and so, relying upon it might imperil the success of Surveyor's mission.

The only practical thing to do with the combination of Surveyor and Centaur is to point the rocket at the moon and let it go all out.

**Surveyor 1's route to moon** (below) will take it to a soft landing in target area shown (right), at edge of region being considered for Apollo landings.



## Surveyor's nonstop trip to the moon will be guided by a star

The flight plan to set down Surveyor I gently on the moon has two innovations besides its soft-landing climax: It will be our first nonstop earth-to-moon space flight, and our first lunar mission hitched to a star.

As soon as Surveyor is released from Centaur's nose cone and allowed to stretch its legs, the spacecraft will locate two reference points it needs to maintain a fixed attitude in space.

The primary one is the sun, from which it draws the energy to recharge its batteries and the warmth to keep its components from freezing in the cold of space.



Urheberrechtlich geschütztes Material

## of new Atlas-Centaur rocket

This is awkward for the scientists in charge of the Surveyor shot. Without the leeway provided by a parking orbit, they are much more restricted in opportunities for favorable launches than in any previous lunar mission. They'd prefer the old launch procedure, but they can't (without risk of failure) have it and Centaur both.

***Closing in.*** When Surveyor is about 1,000 miles from target, the Deep Space Network's controlling station at Goldstone, Calif., will order it to rotate—until the line of fire of its retrorocket engine coincides with the direction in which it's headed.

At about the same time, a few minutes before landing, a downward-aimed TV "approach" camera—a separate instrument from the lunar-surface survey camera—will be turned on. It will take pictures of the nearing lunar surface until the craft is only 13 feet above the moon.

On the way down, altitude-marking radar will keep measuring the rate of approach until the craft is 60 miles above the moon. Then it will signal, first, the vernier motors and, immediately afterward, the retrorocket engine to fire. As they do so, the radar, having served its purpose, will be blown away.

Surveyor's retro engine generates about 10,000 pounds of thrust. It is expected to brake the craft's speed from 6,000 m.p.h. to around 240 m.p.h. in 40 seconds, while

[*Continued on page 190*]

**To test Surveyor's vernier motors,** Hughes Aircraft engineers—who designed and built craft—fired them from model high above ground, suspended from tower on tether, as shown.

The other is Canopus, the same brilliant star that served as a beacon for Mariner 4's triumphant voyage to Mars.

Canopus was chosen rather than the earth because the star's position is comparatively fixed, while that of the earth is not. Success in the expected midpoint correction of Surveyor's trajectory—and, later, in positioning the craft for a feet-first landing—will hang on observing the two reference points. Those in charge of Surveyor's mission couldn't risk the chance that the earth might be in an impossible position relative to the sun, at a crucial time, so they chose to put their reliance on good old Canopus.

When freed from Centaur, Surveyor will automatically point its vertical axis and its solar panel toward the sun. Then, on radio command, it will roll until its Canopus sensor locates the star. The craft will be nudged over by small nitrogen jets.

Once Surveyor has acquired Canopus as well as the sun, its position will remain fixed until the midcourse maneuver, about 15 hours after launch. If Surveyor starts to stray, error signals from its sun and Canopus sensors will trigger the jets and set it straight.

Its midcourse maneuver will be performed automatically, but only after all essential commands have been transmitted from Goldstone and stored in the spacecraft's computer-and-sequencer, for execution on a precise time schedule.

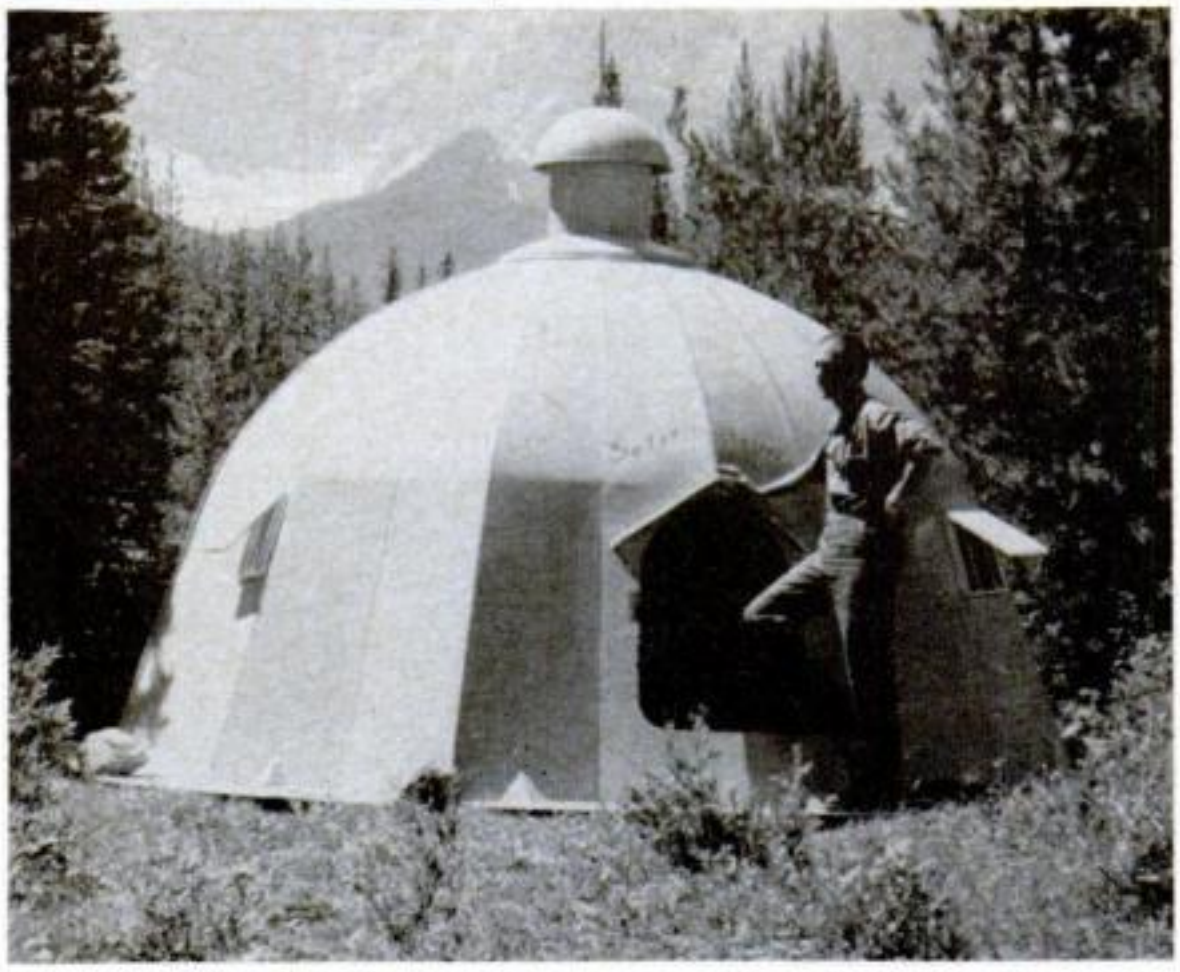
After the midcourse maneuver, assuming that one is needed, Surveyor will again obtain fixes on the sun and Canopus. It will then coast on toward its destined landing spot near the "Ocean of Storms"—at far left of the moon (as we view it) and slightly below the moon's equator.

The small liquid-fueled motors, whose thrust can be throttled to range from 30 to 105 pounds, will alter Surveyor's trajectory when need arises. Mounted around the triangular base of the spacecraft, they correct its attitude in response to signals from a gyro system. They will also help to steady and slow Surveyor to a safe landing at the end of its 64-hour journey.

Surveyor will rely on ground commands far more than any previous spacecraft, most of which have been largely automatic. That was decided in order to keep the lunar explorer as simple as possible and curb its weight.



Urheberrechtlich geschütztes Material



**Camping igloo is 14 feet across, has 7½-foot headroom at crown.**

## Plastic igloo shelters campers

This plastic igloo sleeps several campers, can be knocked down for hauling by trailer, and reassembled at the camp site by one or two men in less than half a day.

It has 12 sections including a door, three adjustable side vents, and a translucent roof vent. They are bolted together at flanges and caulked. Foot-wide bottom flanges can be anchored to the ground or weighted with rocks.

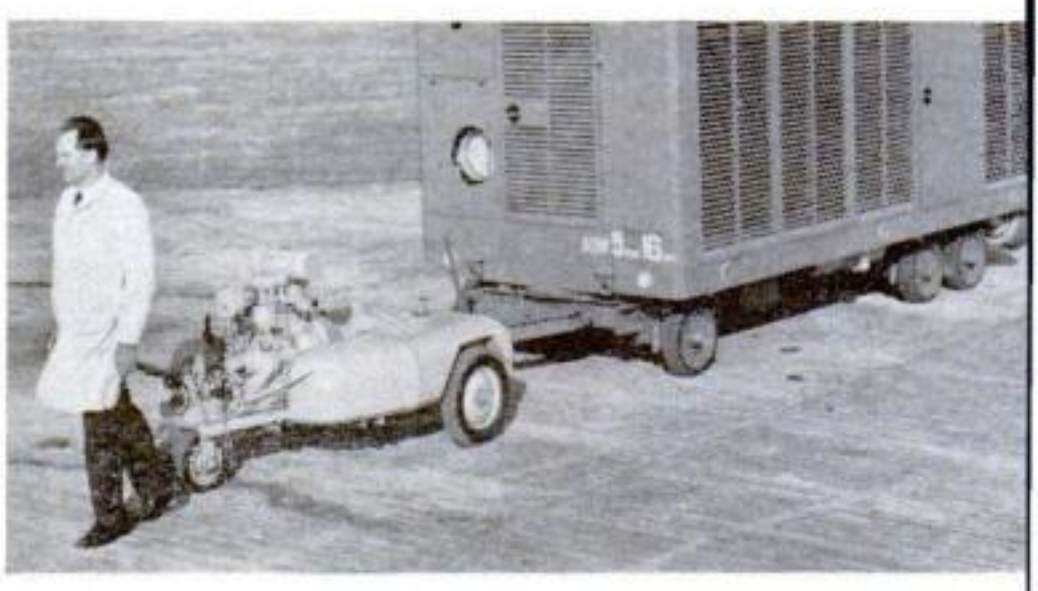
For more room, parallel sections can be inserted between semicircular ends, and extra doors and vents added. If a floor is needed, it can be laid with plywood on two-by-four frames. Century Fiberglass, Calgary, Alberta, makes a standard bright yellow and a choice of colors.

**Foam-plastic insulation,** if needed, is permanently bonded to outside shell of igloo.

**Bolts through flange** hold edges of spherical segments together.

## Motorized brushes shampoo dirty cars

Two huge revolving brushes (one vertical and one horizontal) run on tracks around a car to scrub it clean with water and detergent. Designed by Messerschmitt, wartime German plane maker, the automatic car-washing machine can handle up to 200 cars in an eight-hour working day, cleaning and polishing one car every 2.4 minutes.

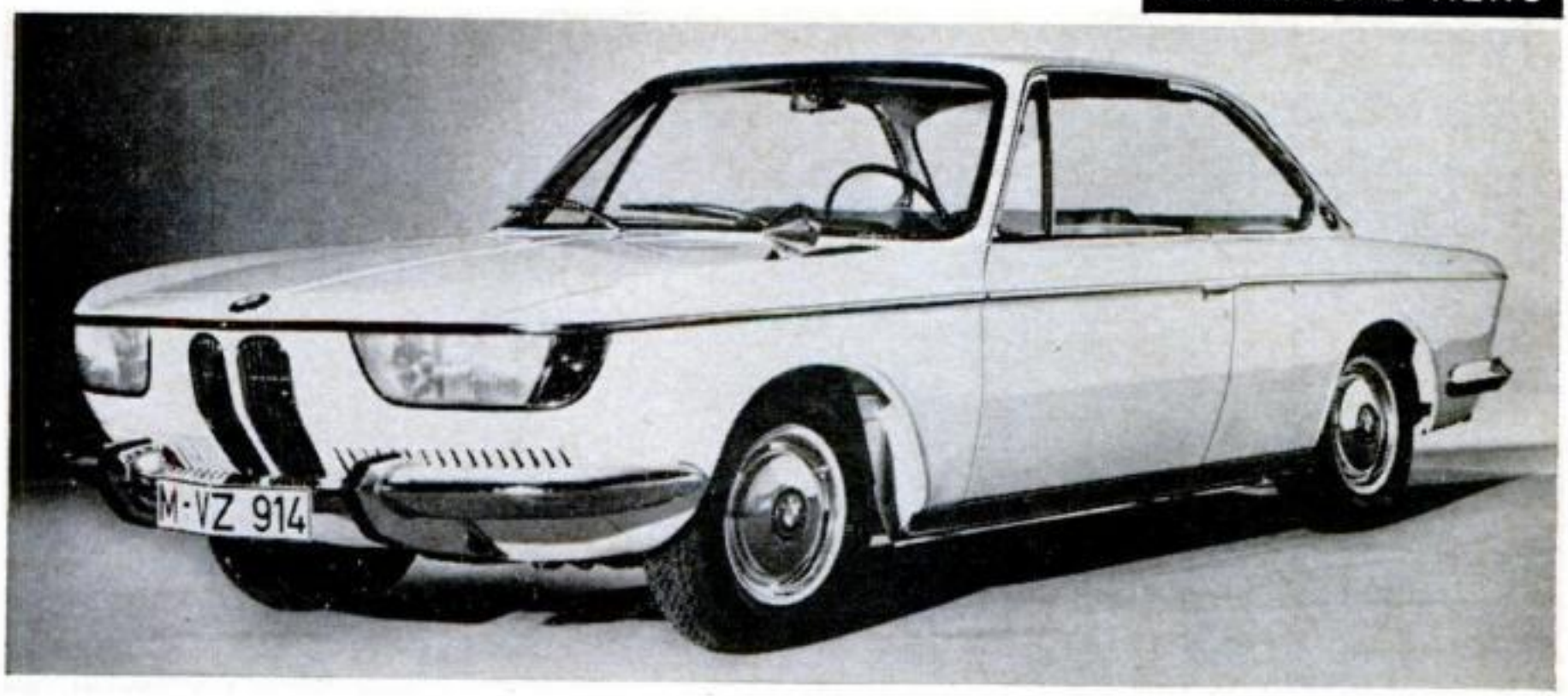


## Tiny tug pulls 18-ton load

A walk-and-tow tractor hauls rolling loads up to 18 tons at British airfields, freight yards, and docks. The pedestrian-controlled vehicle has a tricycle chassis powered by an eight-hp. diesel that drives the rear wheels. A tiller held by the operator steers the front wheel and works the brakes. It contains a squeeze-type throttle.



Urheberrechtlich geschütztes Material




## Elegant new BMW 2000 C

A two-liter BMW made its debut at the Frankfurt Auto Show last month. It competes with the Porsche 911 in performance, seats four, will sell in the U.S. for under $5,000. The engine, a single-OHC four based on the 1800, comes with either 112 or 132 hp. The latter gives 130 m.p.h. Automatic transmission is available.

## Billboard exhibits fine art

Such masterpieces of art as Gainsborough's Blue Boy and the Mona Lisa are beginning to find their way to billboards. O'Mealia Outdoor Advertising Co., Jersey City, is painting reproductions of great works on vacant boards. Perhaps some highway signs may now *add* to the view, not block it out or spoil it for motorists.

## Jet-powered copter breaks record

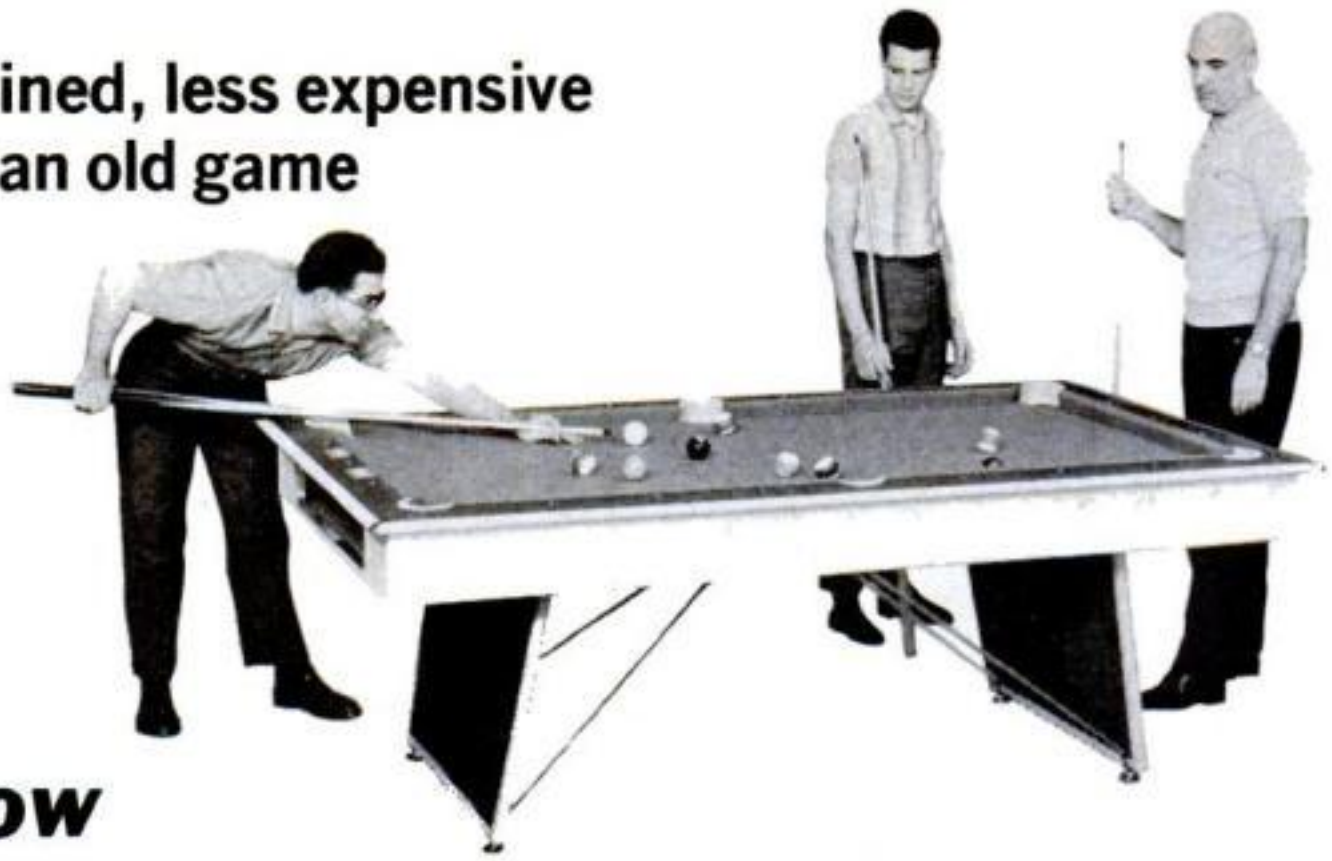
With an auxiliary jet on one side, the Army stub-winged Lockheed XH-51A at right set a 259-m.p.h. speed record for helicopters.

Balancing the weight of the engine on the left, the pod on the right wing holds batteries powering the rotorcraft's electrical system.

The spearlike boom extending from the nose contains a speed sensor used on the run.

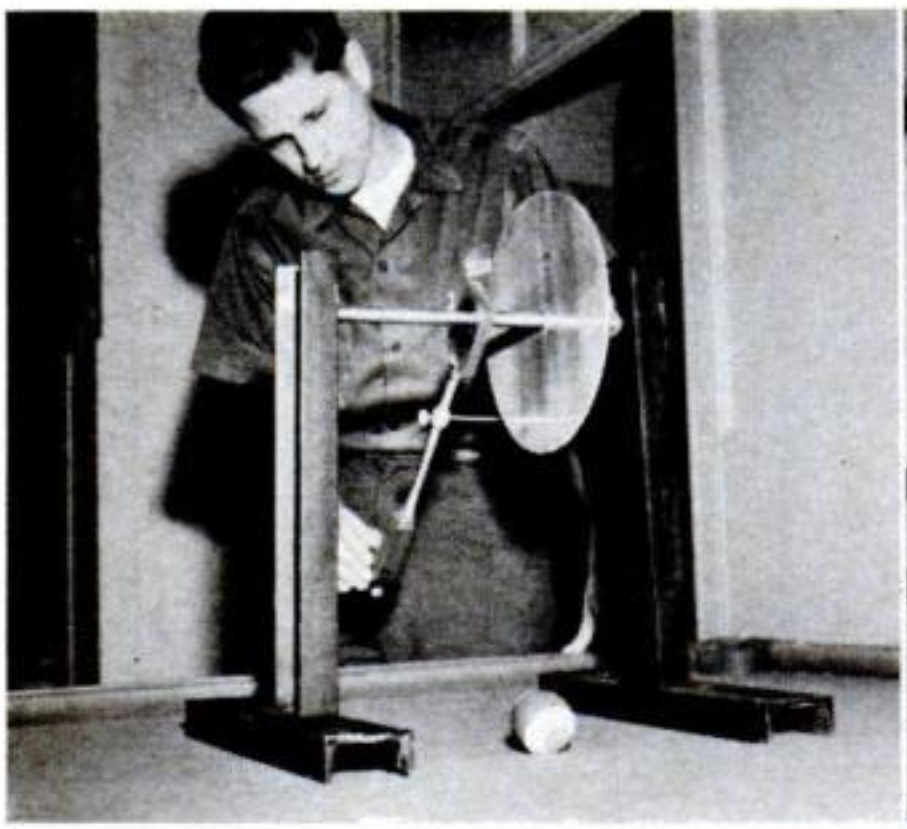
Urheberrechtlich geschütztes Material

**Today's streamlined, less expensive pool tables give an old game new appeal as a family sport**

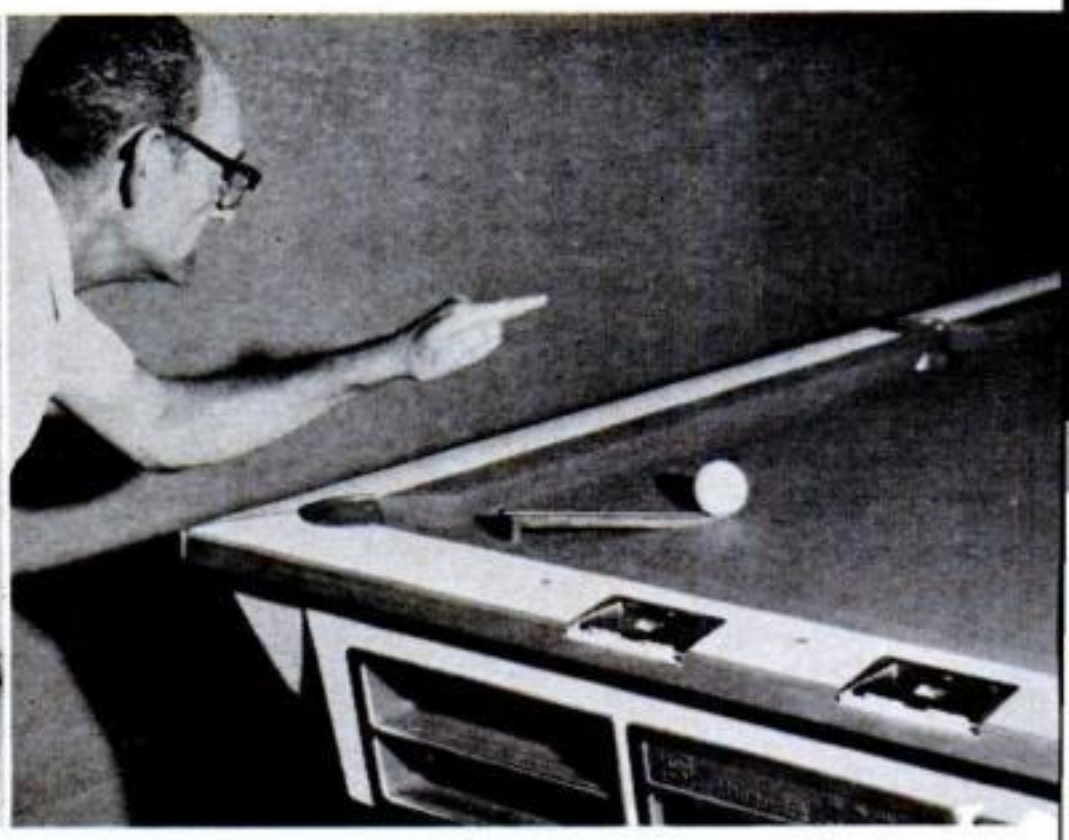


***What you should know***

# Before You Buy a Billiard



**Rebound tester** is used in Sears, Roebuck laboratory to check evenness of rubber cushions all around a billiard table. Technician controls impact by raising a pendulum to measured height.



**Quality-control inspector** checks a Brunswick billiard table for levelness. Ball is released down the ramp and measured for a straight-line roll that indicates whether bed is properly level.

## By Herbert Shuldiner

A NEW species of pool shark has taken over the ancient game of pocket billiards. But this modern cue-stick wielder doesn't hang out in dingy poolrooms that once were symbols of a misspent youth.

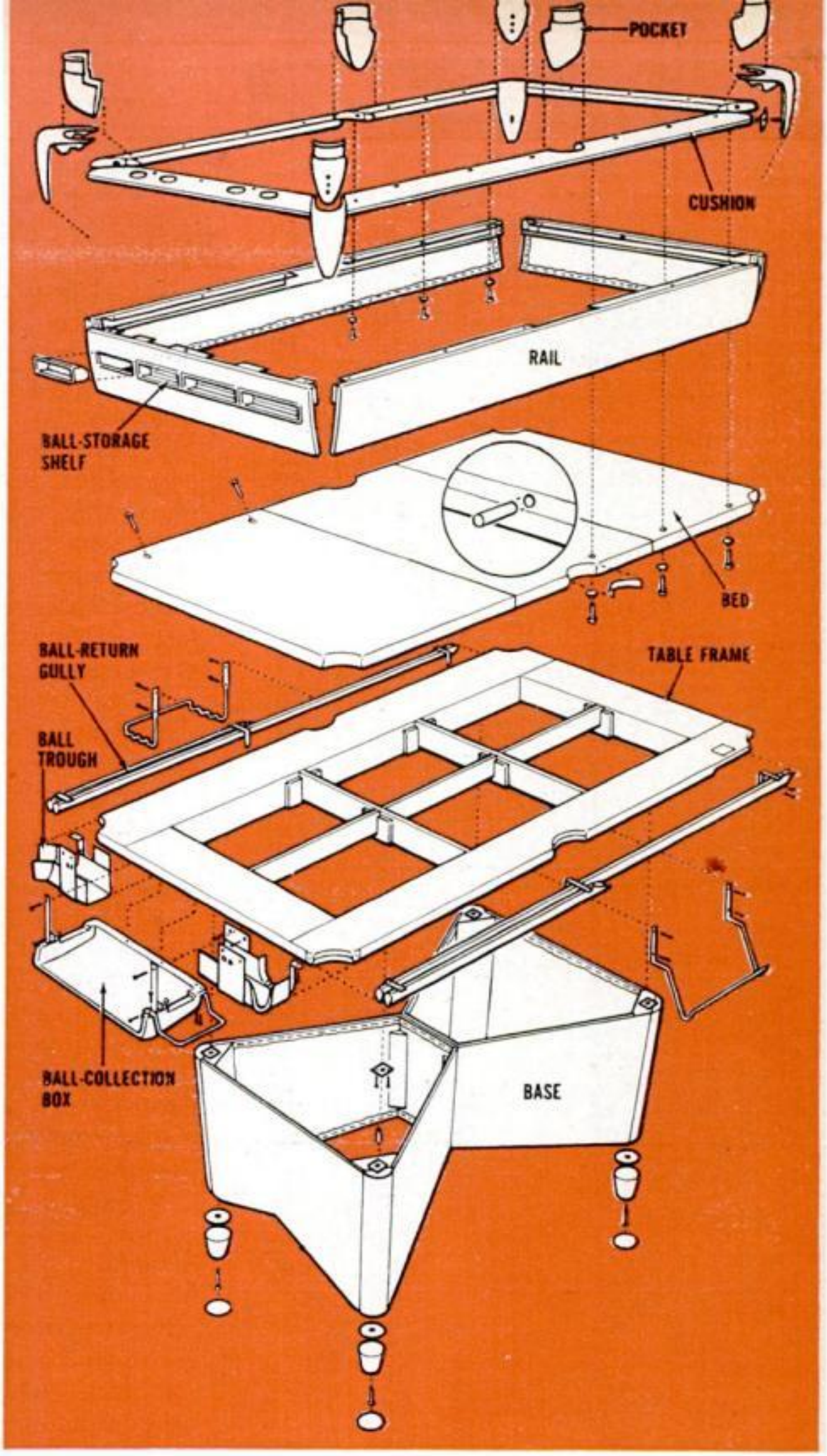
The modern shark might even be your next-door neighbor, and the chances are his wife and kids are pool addicts, too. Pocket billiards has become so popular that hundreds of thousands of American families now own billiard tables. Manufacturers are racking up nearly $20 million annually in home-table sales.

The billiards boom has been sparked by the introduction of economical, lightweight tables, specially designed for homes and even apartments. You can buy an acceptable pool table for as little as $80. The average price is about $150. But you'll have to spend about $300 to get a pool table that approaches professional quality.



Urheberrechtlich geschütztes Material

# Table




**Anatomy of a billiard table** is revealed in this exploded drawing of an AMF slate-bed model. The bed is made of three matched pieces of slate that are fastened together with steel dowels (see circled inset). The table components are made with the precision that master cabinetmakers use, to make a perfectly level base for the slate to rest on. Leg levelers are used to compensate for uneven floors.

**Honeycomb** billiard-table bed doesn't bend under the combined weight—nearly a ton—of these 12 people.

One manufacturer, The National Billiard Co. (3956 Virginia Ave., Cincinnati, Ohio) even sells a table like this in kit form. It costs about $187. Standard professional tables can cost as much as $1,500.

The streamlined styling and dazzling colors of most of these tables (enough to make old-time hustlers blush) also make them an attractive addition to a basement or a game room.

To get the most fun out of a pool table, you have to select it as you would a precision instrument. That's because the key to real billiards enjoyment is having an almost perfectly uniform level surface to play on.

***Do you need slate?*** Up to a few years ago, the only way to have a perfectly level billiard-table top, or bed, as it is known in the trade, was to make it out of rock—slate—and the best tables today still are. Slate is terrific as a pool bed. Balls roll better on it than anything else. It gives a table the weight that keeps it from being easily

CONTINUED


Urheberrechtlich geschütztes Material

## PS Buying Guide to Billiard Tables

| Brand | Size (feet) | Bed | Weight (pounds) | Price |
|---|---|---|---|---|
| **AMF** | | | | |
| Shelbourne | 4½ x 9 | 1 1/16" SL | 1,150 | $1,375 |
| Grand Prix | 4½ x 9 | 1 1/16" SL | 1,150 | 1,075 |
| Grand Prix | 4 x 8 | 1 1/16" SL | 1,000 | 995 |
| LeMans | 4 x 8 | 3/8" SL | 560 | 795 |
| Crestline II | 4 x 8 | 1¾" PB | 360 | 595 |
| Delray | 4 x 8 | 1¾" PB | 350 | 495 |
| Continental | 4 x 8 | 1½" PB | 330 | 395 |
| **BRINKTUN** | | | | |
| Esquire | 4 x 8 | 2½" HC | 380 | 495 |
| Earl | 4 x 8 | ¾" SSL | 530 | 430 |
| Baron | 4 x 8 | ½" SSL | 350 | 350 |
| Criterion | 4 x 8 | ¾" PB | 305 | 220 |
| Criterion | 3½ x 7 | ¾" PB | 255 | 200 |
| Empress II | 4 x 8 | ¾" PB | 250 | 170 |
| Empress II | 3½ x 7 | ¾" PB | 230 | 150 |
| Empress I | 4 x 8 | ½" PB | 225 | 110 |
| Empress I | 3½ x 7 | ½" PB | 200 | 90 |
| **BRUNSWICK** | | | | |
| Squire | 4½ x 9 | 1" SL | 1,040 | 1,095 |
| Squire | 4 x 8 | 1" SL | 940 | 995 |
| Monarch | 4 x 8 | 2½" HC | 300 | 595 |
| Celebrity | 4 x 8 | 2½" HC | 290 | 495 |
| Executive VIII | 4 x 8 | 2½" PB | 205 | 395 |
| Executive VII | 3½ x 7 | 2½" PB | 185 | 365 |
| Edgebrook VIII | 4 x 8 | 5¾" HC | 285 | 295 |
| Edgebrook VII | 3½ x 7 | 5¾" HC | 240 | 275 |
| **GOTHAM** | | | | |
| Buckingham | 4½ x 9 | ¼" SL | 550 | 500 |
| York | 4 x 8 | ¾" SL | 510 | 470 |
| York | 4 x 8 | ¼" SL | 450 | 375 |
| Essex | 3½ x 7 | ¼" SL | 350 | 325 |
| **IRVING KAYE** | | | | |
| Ambassador 90 | 4½ x 9 | ¾" SL | 1,050 | 775 |
| Ambassador 80 | 4 x 8 | ¾" SL | 900 | 675 |
| Ambassador 75 | 3½ x 7 | ¾" SL | 600 | 500 |
| Ambassador 70 | 3 x 6 | ¾" SL | 500 | 450 |
| **TOPLINE** | | | | |
| Playmaster Deluxe | 4½ x 9 | 1" SL | 1,000 | 1,085 |
| Playmaster Deluxe | 4 x 8 | 1" SL | 925 | 985 |
| Playmaster | 4½ x 9 | 1" SL | 1,000 | 985 |
| Playmaster | 4 x 8 | 1" SL | 925 | 885 |
| Spartan II | 4½ x 9 | 1" SL | 1,000 | 885 |
| Spartan II | 4 x 8 | 1" SL | 925 | 785 |
| Coronado | 4 x 8 | ¾" PB | 238 | 265 |
| **ROZEL** | | | | |
| Gold Cup | 4½ x 9 | 1" SL | 1,300 | 1,398 |
| Gold Cup | 4 x 8 | 1¾" HC | 458 | 698 |
| Gold Cup | 3½ x 7 | 1¾" HC | 425 | 648 |
| Heirloom | 4 x 8 | 1¾" HC | 420 | 748 |
| Golden Nugget | 4 x 8 | 1¾" HC | 300 | 398 |
| Hustler | 4 x 8 | 1" SSL | 320 | 345 |
| **SEARS, ROEBUCK** | | | | |
| Catalogue #2772 | 4 x 8 | 2½" HC | 375 | 475 |
| 2668 | 4 x 8 | 5" HC | 310 | 390 |
| 2667 | 3½ x 7 | 5" HC | 255 | 375 |
| 2666 | 4 x 8 | ¾" PB | 315 | 285 |
| 2665 | 3½ x 7 | ¾" PB | 250 | 270 |
| 2664 | 4 x 8 | ¾" PB | 240 | 175 |
| 2663 | 3½ x 7 | ¾" PB | 220 | 160 |
| 2662 | 3½ x 7 | ½" PB | 180 | 125 |
| **SUPERIOR** | | | | |
| President | 4 x 8 | ½" SL | 530 | 595 |
| President | 4 x 8 | 2" HC | 285 | 495 |
| Admiral | 4 x 8 | ½" SL | 480 | 365 |
| Admiral | 4 x 8 | 2" HC | 235 | 300 |
| Commander | 4 x 8 | 1¼" HC | 185 | 239 |
| Commander | 4 x 8 | ¾" PB | 200 | 199 |
| Ensign | 4 x 8 | 1¼" HC | 185 | 199 |
| Ensign | 3½ x 7 | 1" HC | 140 | 189 |
| Ensign | 4 x 8 | ¾" PB | 195 | 179 |
| Ensign | 3½ x 7 | ¾" PB | 150 | 149 |
| Cadet | 4 x 8 | ½" PB | 180 | 149 |
| Cadet | 3½ x 7 | ½" PB | 140 | 129 |
| Gob | 3 x 6 | ½" PB | 110 | 79 |
| Vice President Pro | 4½ x 9 | ½" SL | 700 | 695 |
| V.P. Homeowner | 4 x 8 | ½" SL | 570 | 349 |
| V.P. Family | 4 x 8 | 1" HC | 215 | 229 |
| V.P. Den | 4 x 8 | 1" HC | 195 | 179 |
| V.P. Den | 3½ x 7 | 1" HC | 155 | 159 |
| V.P. Den | 4 x 8 | ½" PB | 200 | 169 |
| V.P. Den | 3½ x 7 | ½" PB | 160 | 149 |
| V.P. Pal | 4 x 8 | ½" PB | 170 | 99 |
| V.P. Pal | 3½ x 7 | ½" PB | 135 | 79 |

SL—slate; SSL synthetic slate; PB—particle board; HC—honeycomb

moved—an important factor because table movement shifts balls around and disrupts serious play. Drop a ball on a slate surface and it won't dent or chip. And most of all, it is practically inert. It won't sag or warp with changes in temperature and humidity.

But slate is expensive, and unless money is no object or you're a rock-ribbed traditionalist, buying a pool table with a non-slate bed is a way to get a home pool table at moderate cost.

While slate tables require expensive custom installation, you can set up a non-slate table by yourself in most instances. Regulation beds range from ¾ to 1½ inches in thickness. The slate comes in three pieces that must be carefully matched and fastened together with steel pins. Installation charges run up to $50 or more. But some tables are made with ⅜- or ½-inch slates veneered to hardboard or particle board. Tables made with these tops come in one piece and don't require special installation.

***If you can't have slate.*** Here are the three most widely used slate substitutes:

- Particle board—like U. S. Plywood's Novoply and Weyerhaeuser's Timblend. These are made of wood chips and flakes bonded together by epoxy resins under controlled temperatures and pressure. Because particle board has no grain, it is relatively stable and free from warping. Dents can be easily repaired by filling with epoxy and then sanding the surface smooth.
- Small-celled corrugated-paper honeycombs. This amazingly strong and stable material is a variation of the aluminum honeycomb sandwiches used in aircraft wing structures. In pool-table construction, corrugated paper is the inner part of the sandwich, while tempered hardboard or asbestos-and-cement board provides the rigid outside.
- Man-made slates. These asbestos-and-cement materials, like Johns-Manville Colorlith, aren't quite as inert as real slate but are highly resistant to sagging and warping.

None of these materials really achieves the levelness of natural slate, which can be sanded to a tolerance of plus or minus .008 inch. The substitutes range from .015 to .070 inch.

This difference is enough to upset the fine game played by exceptional pool shooters, but it will barely affect the average



Urheberrechtlich geschütztes Material

player, or even the slightly better player.

Many of these new materials are guaranteed by pool-table makers to stay level for periods of up to five years. Bed-leveling devices, which were once required on almost all slate substitutes, are pretty much unnecessary in all but the cheapest category.

Brunswick guarantees its Levellite (honeycomb) bed for five years. AMF guarantees its non-slate tables for five years and has a service force of 360 people around the country to back this up. Sears, Roebuck, the nation's largest retailer of billiard tables, gives a satisfaction-guaranteed-or-your-money-back offer on any table it sells.

The best protection you can get is to buy a brand with a good reputation from an established dealer.

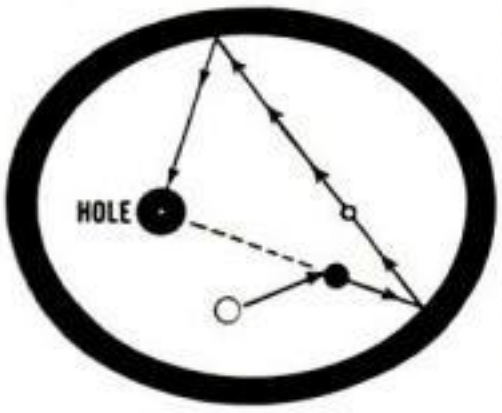
***The check points.*** Here are some other important points to check when you buy a pool table:

- Make sure you have enough space to get the table into the room in which you intend to put it. You also need at least 4½ feet of unencumbered space around the table to use a regulation-size cue (57 inches for adults, 48 inches for youngsters).
- The table must be twice as long as it is wide. Professional tables are 4½ by nine feet. Most home tables are four by eight feet. But true billiard angles can be maintained regardless of dimensions as long as the basic proportions are followed. An exception is the elliptical table, which utilizes different angles for making cushion shots.
- Lean against the table. It shouldn't move. Even a slight movement can shift balls and ruin your game. Professional tables tip the scales from 1,000 pounds on up and are steady as a mountain. Home models scale downward from about 500 pounds. But even lightweight models should make up for their lack of mass with a structural design that will keep them steady.

[*Continued on page 200*]

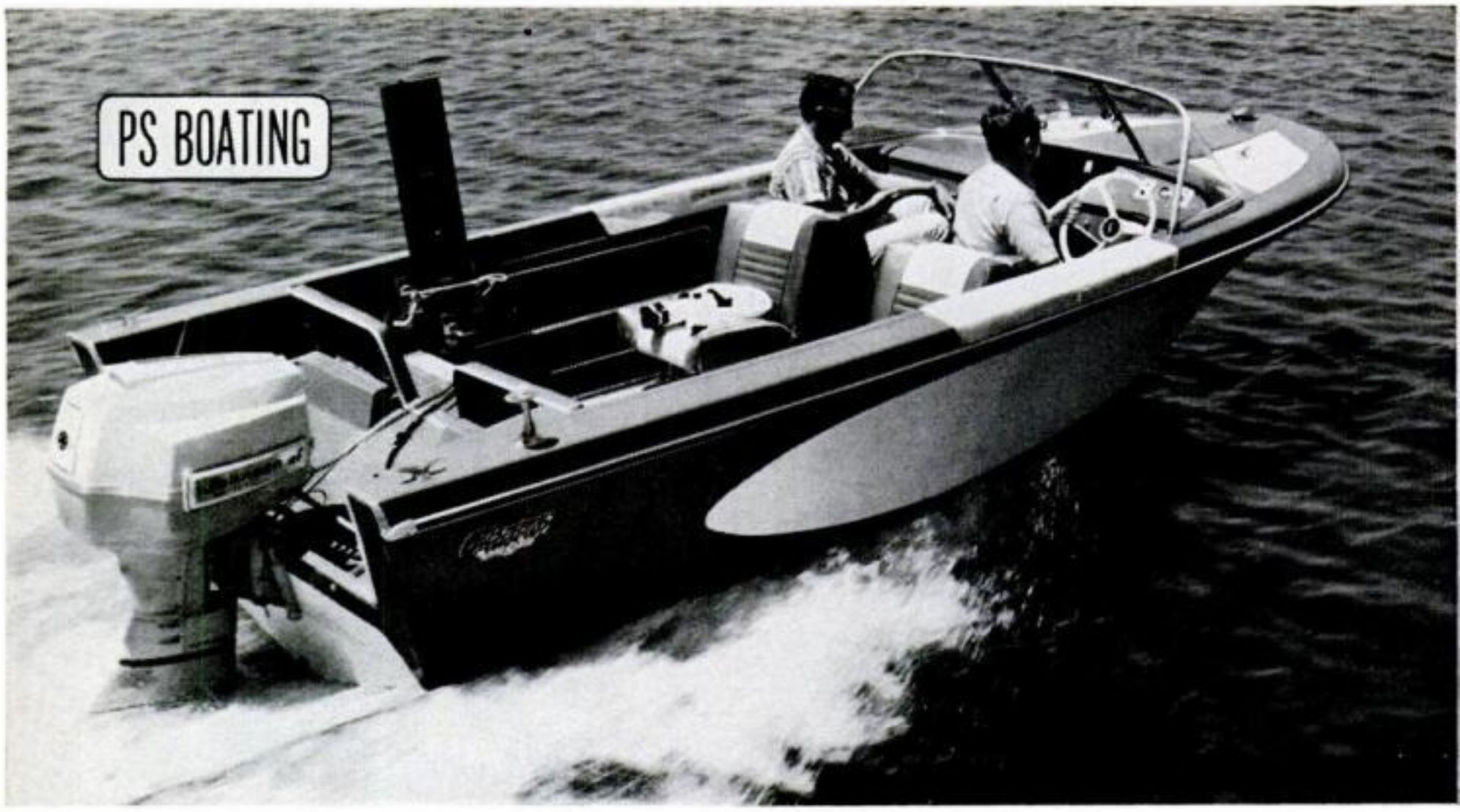
**Don't sit on it**—play on it. Actually, you can do both on this Sears, Roebuck convertible sofa. It opens up into a 2½-by-five-foot fully playable billiard table. You can own one for $200.

## Elliptipool table is a one-hole game




**This new form** of billiards grew out of a high-school math project. Art Frigo, the inventor, found that the distance remained constant between the two fixed foci and any point on the curve of an ellipse. He made a table with one hole and a focus point 12 inches away. A ball passing over the focal point rebounds off the cushion and into the hole. Gotham Educational Equipment Co., Mt. Vernon, N.Y., sells it.

Urheberrechtlich geschütztes Material



**JOHNSON** **With stopwatch, measured course, and fuel-flow gauge,** we tested the brand-new 100-hp. outboard for 1966. Pushing a 17-foot Glastron deep-V fiberglass hull, it gave us 5.6 miles per hour more speed than last year's top Johnson, the 90-hp. Note steep transom angle of the boat, and far-out tilt of the motor.

# '66 Outboards Are Hotter,

**The big are bigger, the small more sophisticated. And a fold-up fisherman retracts its gear and pops into a carrying case**

## By Jim Roe

OUTBOARD horsepower will hit a new high in 1966, with the introduction of Mercury's new 110-hp. motor. There will be four new motors in the 100-hp.-and-over class: that Merc 110-hp., a new 105-hp. from Chrysler, and new 100-hp. models from both Johnson and Evinrude.

***What's new at Evinrude.*** The most unusual new motor for next year is also one of the smallest. This is the new three-hp. fold-up motor. It has a hinged joint part way down the shaft. When two retaining clamps are loosened, the whole lower unit folds back and up toward the power head, making the motor 15 inches shorter and just the right length to stow in its handy plastic carrying case. Folded and packed, this 37-pound power plant is easy to carry on a portage and also stows handily in an auto trunk.

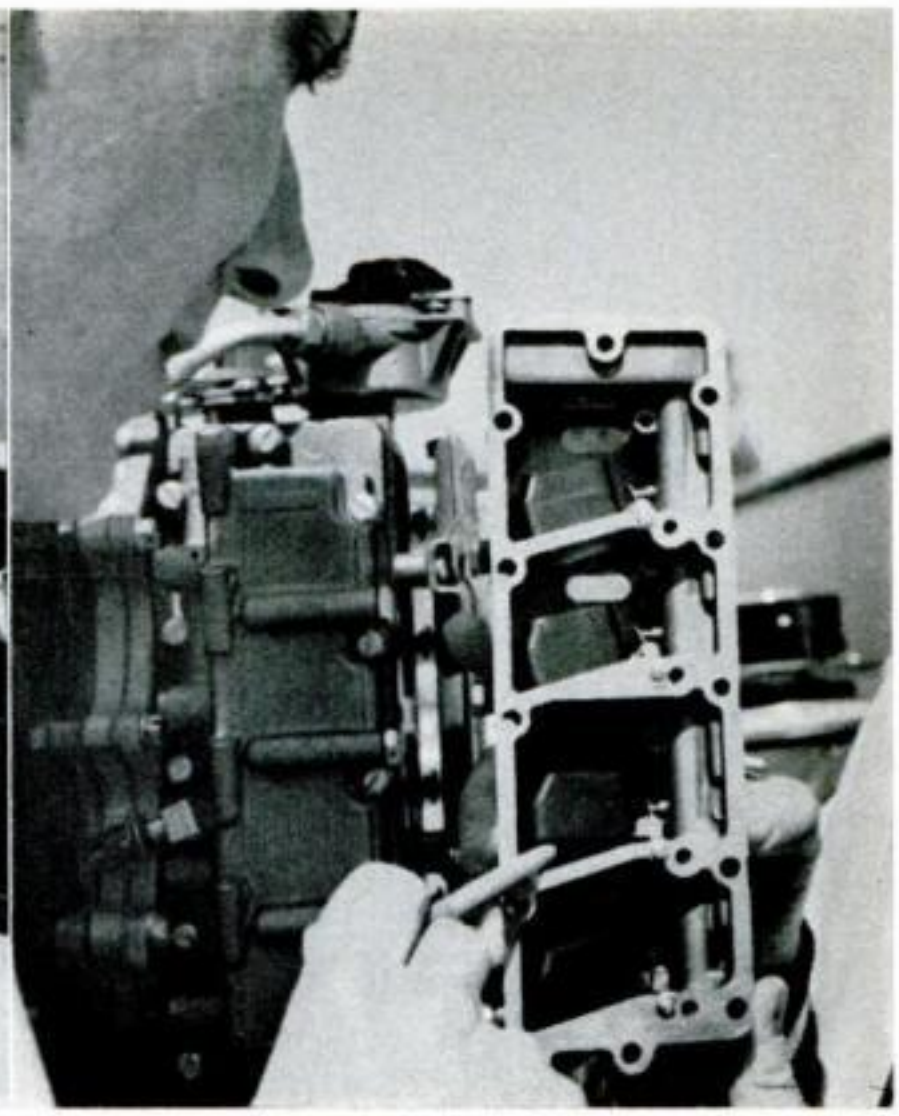
The long-shaft three-hp. Evinrudes, designed for sailboat use, will be take-apart motors. They'll have no hinge pin. When the fasteners are loosened, the gear case comes off so the engine can be stowed in two small space-saving pieces.

Up at the other end of the line is the largest outboard Evinrude has ever built, the new Starflite 100-S with a full 100 hp. It uses the completely tuned exhaust system of a racing engine, and also has a new, more rugged, and more efficient lower unit. Along with the tuned exhaust, the 100-S



Urheberrechtlich geschütztes Material

**Fuel consumption** for new Johnson 100-hp. outboard was 9.33 gallons per hour at full throttle, our fuel-flow gauge (upper right in photograph) showed. Speed was 39.7 miles per hour.



**Redesigned oil-drain system** improves carburetion of 100-hp. motor, makes for better idle characteristics. Floats and needle valves distribute drain oil back into carburetor equally.

# Handier, and Quieter

has redesigned porting, manifolding, spark timing, and carburetion, and a revised combustion chamber.

Besides this largest Evinrude and the folding smallest, there is a whole family of motors in between. Evinrude offers 17 different models for 1966, in 10 different horsepower ratings. All are designed to operate on a 50:1 gas-to-oil ratio. New aluminum-alloy pistons built to withstand high thermal and mechanical stresses are standard on the 33- through 100-hp. models. And the 40-hp. through 90-hp. models have new anti-scuff piston rings.

***What's new at Mercury.*** Ever since 1954, the most powerful production outboard has been a Mercury. And that's the way it's going to be in 1966. The 100-hp. ceiling has now been broken, and the 110-hp. Merc 1100 is the new power champion.

Mercury engineers say that the new six-cylinder in-line 110-hp. engine will outperform any other outboard ever marketed. Its 93.5 cubic inches produce more horsepower per cubic inch and more horsepower per pound than any previous outboard.

The 1100 is equipped with Polar-Gap spark plugs, as is the six-cylinder, 95-hp. Merc 950. These are designed to run 800 to 1,000 degrees cooler than ordinary plugs, and to last up to twice as long. Since carbon deposits are literally blasted off the insulator tip, the plugs offer good anti-fouling protection and help eliminate pre-ignition.

Last year Mercury introduced a new silencing system in four- and six-cylinder models. The system has now been added to four of the 1966 two-cylinder Mercs to help achieve a 50-percent reduction in sound. The silencing system includes a new aluminum wraparound cowling, acoustically lined; new top-cowl isolating mounts; and isolation of the exhaust tube and drive

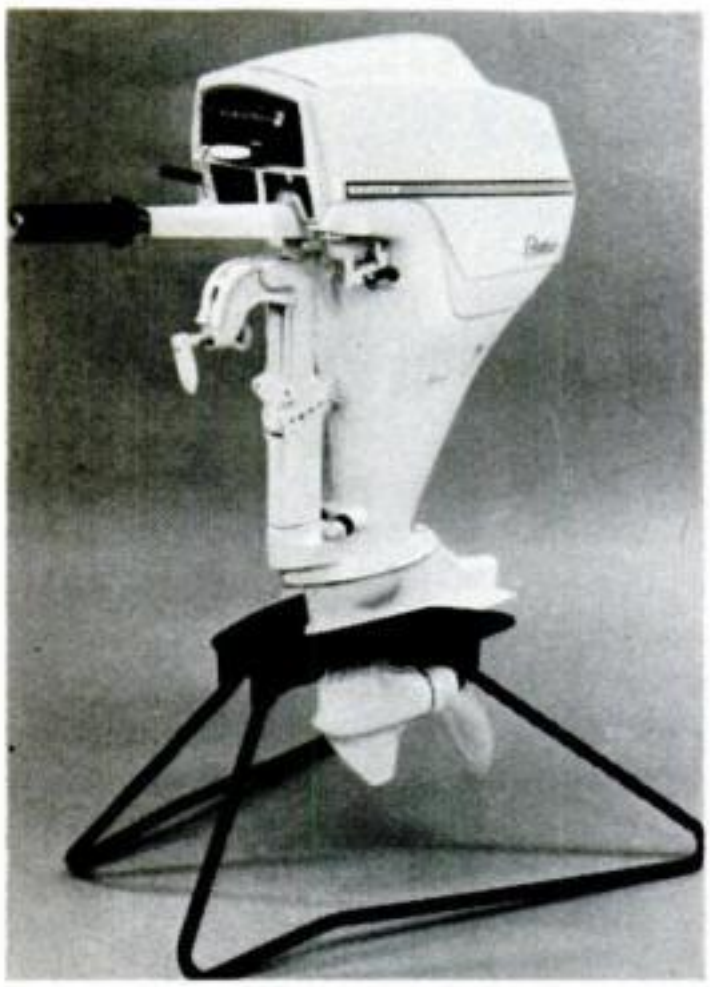
CONTINUED



Urheberrechtlich geschütztes Material

## MONTGOMERY WARD

**Two-cylinder** 50-hp. Sea King motor has displacement of 44.7 cubic inches. Cylinders are die-cast aluminum with cast-in iron sleeves. Crankcase also is of die-cast aluminum. Pistons are of a permanent-mold aluminum alloy, with a forged, alloy-steel, fully heat-treated crankshaft. Gear ratio is 13:21.



## SEARS

**Nine-hp.** Ted Williams fisherman has an electric-starting mechanism. Said to be smallest and lightest motor in its power class, it also has a water-muffled exhaust, full gearshift, automotive-type fuel pump. Displacement is 10 cubic inches. Power-tilt drive allows shallow-water running.

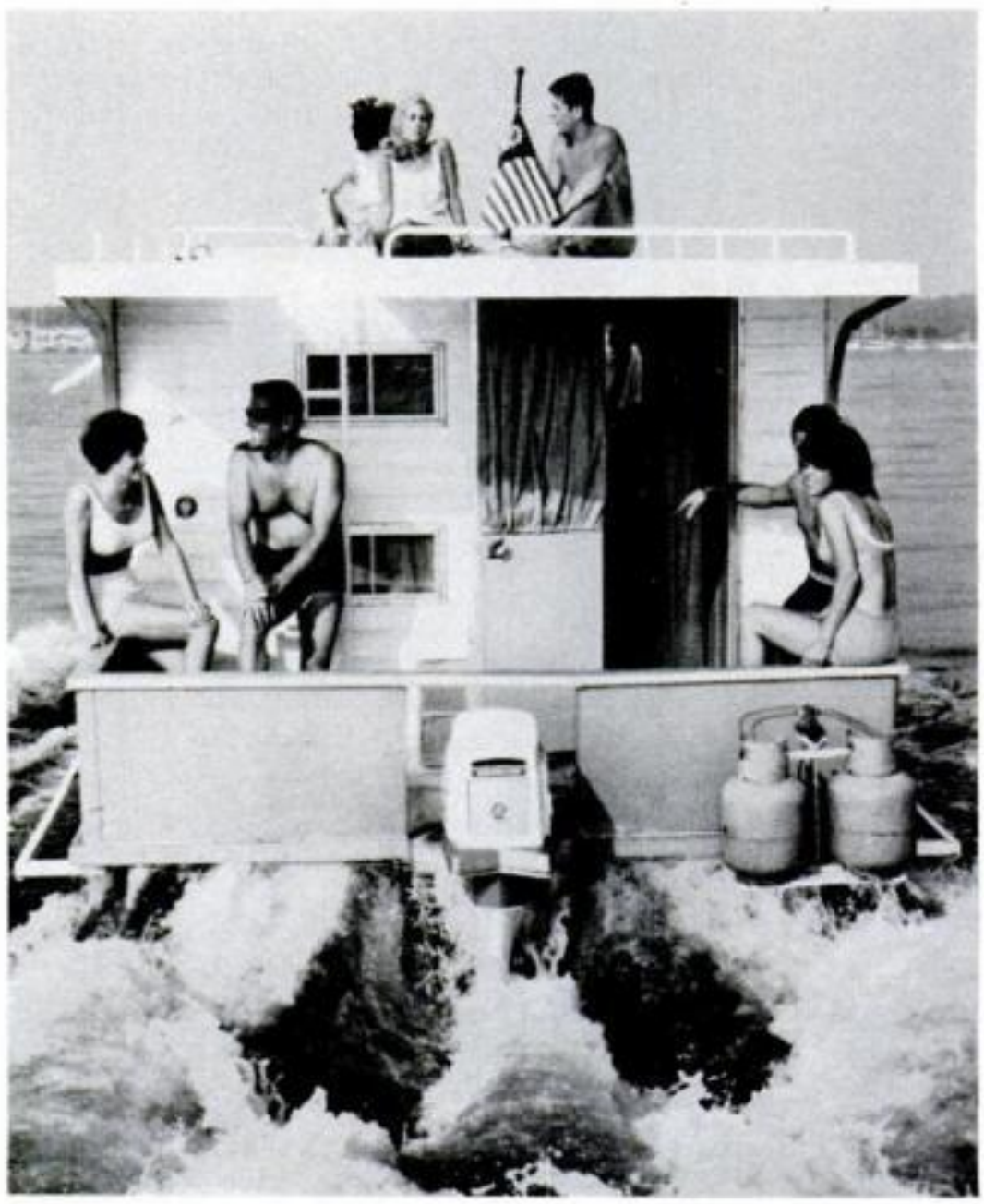
shaft by a "wall of water." Control linkages and fuel-line fittings have been relocated inside the cowling, and are sealed off with neoprene-rubber sound seals. The steering control arm is rubber-isolated to keep motor vibration and sound from passing through remote steering controls into the boat.

All nine new Mercury models—ranging from 3.9 hp. to that 110 hp.—are designed for a 50:1 gas-to-oil ratio.

Two of Mercury's middle-range motors have new features for more power. The 35-hp. Merc 350 has a new 32.5-cubic-inch two-cylinder power head to give more thrust for skiing. The four-cylinder 50-hp. Merc 500 has a new gear ratio and new three-bladed props.

***What's new at Johnson.*** With the assistance of engineer Jim Mellinger, I had an opportunity to test the new Johnson 100-hp. Golden Meteor and to see the engineering techniques that tuck 100 horsepower neatly inside its glistening white hat.

First, we ran some speed tests to compare it with last year's Johnson 90-hp. motor. We used the same

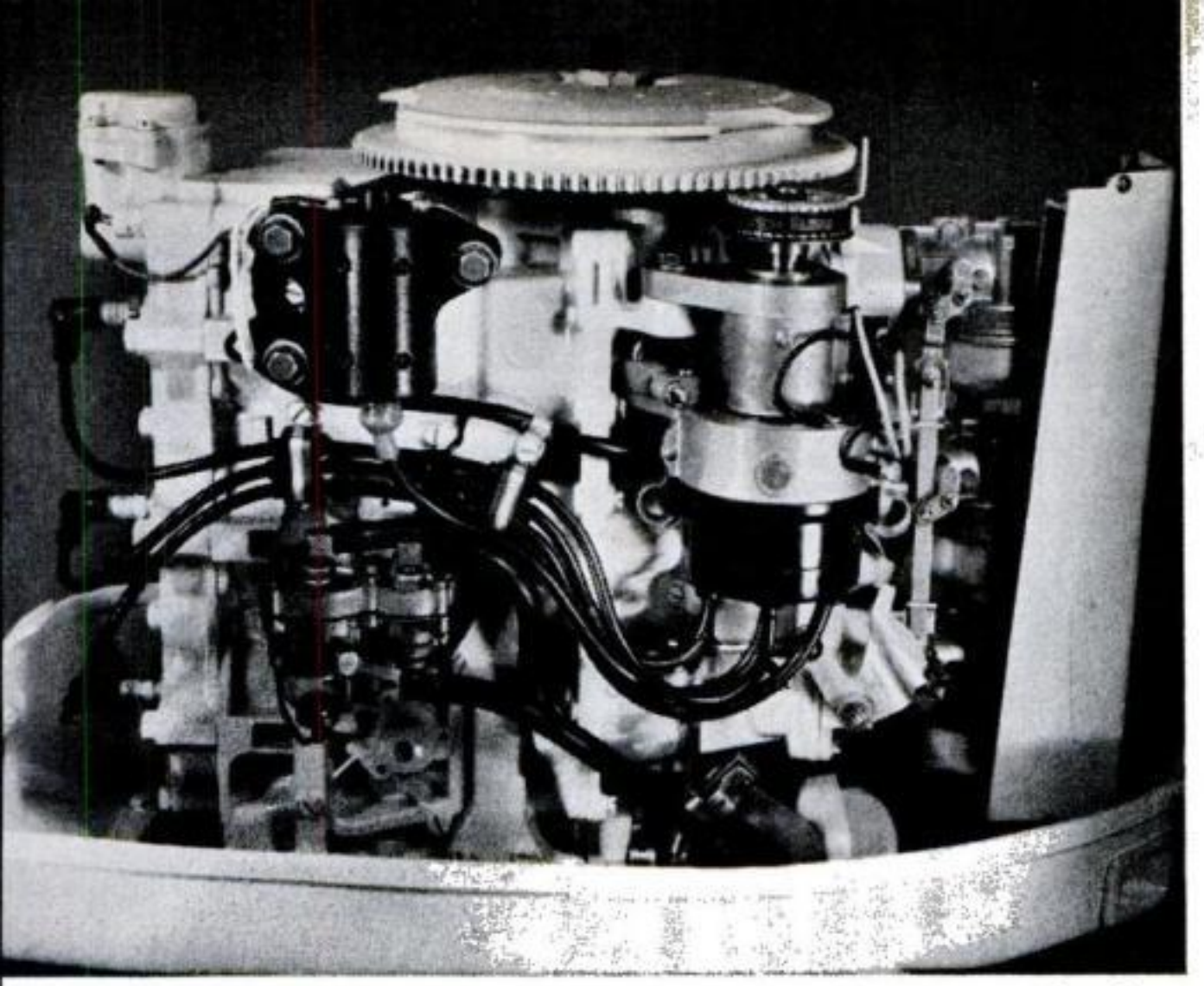


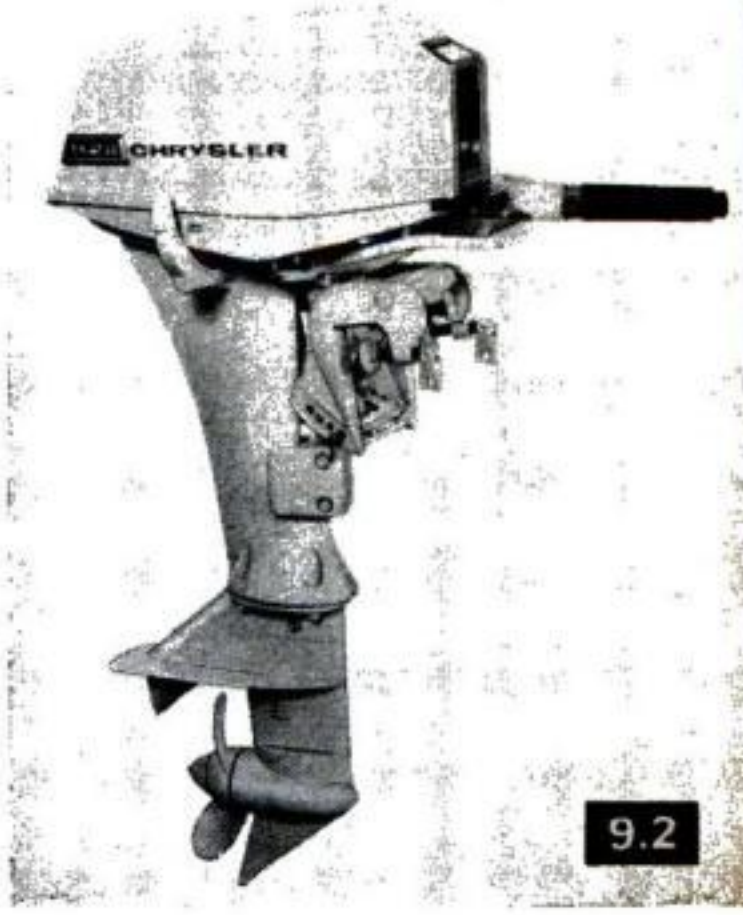
## HOMELITE

**Four-cycle,** 55-hp. outboard is great for pushing heavy loads like this houseboat. The motor operates quietly, does not require mixing of oil and gas, since oil is in a separate automotive-type crankcase. For 1966, Homelite motors come in two models, the Deluxe and the Grand Prix. These outboards have only slight modifications from 1965 models. They have thermostatically controlled cooling and are equipped with a 20-amp alternator.



Urheberrechtlich geschütztes Material






**CHRYSLER** **A newcomer to outboards** in 1966, Chrysler has long been active in the inboard and stern-drive field. Top of the line is the brand-new 105-hp. outboard shown above at right. Its four cylinders each produce more than 25 hp. Shown above with its shroud removed is Chrysler's new 75-hp., three-cylinder power head. Other outboards range through many power options down to a 3.5-hp. model. All feature exclusive baked-on enamel finish.

boat in each case—a fast-stepping 17-foot Glastron Model 171 with a deep-V hull. The 90-hp. put us over the measured course at 34.1 m.p.h. We switched motors to try out the new 100-hp. We went 5.6 m.p.h. faster: 39.7 m.p.h. Fuel consumption increased only moderately.

The new 100-hp. motor has the same basic engine block as last year's 90. The 10-hp. increase has been obtained a number of ways: The carburetor has been recalibrated, and the reed-valve plates have been changed somewhat. The intake- and exhaust-port heights have been altered to give maximum power at a good fuel economy and not overscavenge the engine with raw fuel. The compression ratio has been increased from an average of 5:1 to a new 5½:1, and the exhaust system has been tuned by altering the shape of the exhaust chamber in the power head.

When you line up the new 100-hp. Golden Meteor alongside last year's 90-hp., one of the most noticeable differences is in the size of the lower unit. The new lower-unit gear housing is much bigger and more blunt-nosed. Engineers assured me its underwater drag is no greater. The 16:28 gear ratio of the new gear case, however, greatly improves acceleration and skier-pickup ability.

The Golden Meteor V100 has a large family of smaller brothers. Two of these—the Sea Horse V80 and the Sea Horse 20—are all-new engines. There is a total of 16 models, in 10 different horsepower classes. All are designed for use with a 50:1 ratio of gas to oil. All the new Johnsons are engineered for quiet operation.

CONTINUED



Urheberrechtlich geschütztes Material

## EVINRUDE

**Here's a first!** This three-hp. motor folds up for easy carrying. You simply loosen stainless-steel swivel fasteners: the lower unit folds back toward the power head. The whole motor then tucks into a handy fiberglass carrying case. A long-shaft three-hp. motor for sailboats does not hinge, but has an easily removable lower unit so it, too, can be stored in a small space in two separate pieces.

***What's new at Chrysler.*** The company has long been a producer of large inboard marine engines, and for some time has also manufactured stern drives. Now there are Chrysler outboards. The 1966 models will range in horsepower from 3.5 to 105, with in-between models of 6, 9.2, 20, 35, 45, 50, and 75 hp.

The new Chrysler 105 is a four-cylinder motor, with a displacement of 96.55 cu. in. It has a full-length acoustical silencing chamber. It also has a V-reed fuel-induction system, a water-cooled exhaust, a spline-drive propeller shaft, and hydraulic shock absorbers.

The Chrysler 50 is a two-cylinder, two-cycle, 50-hp. motor. It set the world's 10,000-mile endurance record early in 1965.

The Chrysler 9.2 is completely new, designed especially for fishermen. It weighs only 55 pounds and is designed for easy carrying and convenient storage. Its low-level rewind starter provides easy one-hand starting without tipping up the motor. It has a twist-grip speed control, full gearshift.

***What's new at McCulloch.*** There are outboards in horsepower ranges from four to 75. The new 7½-hp. weedless electric-starting motor uses a DC starter and generator mounted directly on the flywheel. The starter button is at the tip of the steering handle.

The McCulloch 4 is one of the few air-cooled outboards in boating history. Its

## McCULLOCH

**New four-hp. motor** shown below is air cooled. Its two-cycle, one-cylinder power head is an adaptation of McCulloch's widely used chain-saw engine. Model 4 weighs 37 pounds. It has lever speed control, with 360-degree steering to provide reverse. Fuel tank is built in. A 7½-hp. model (below,

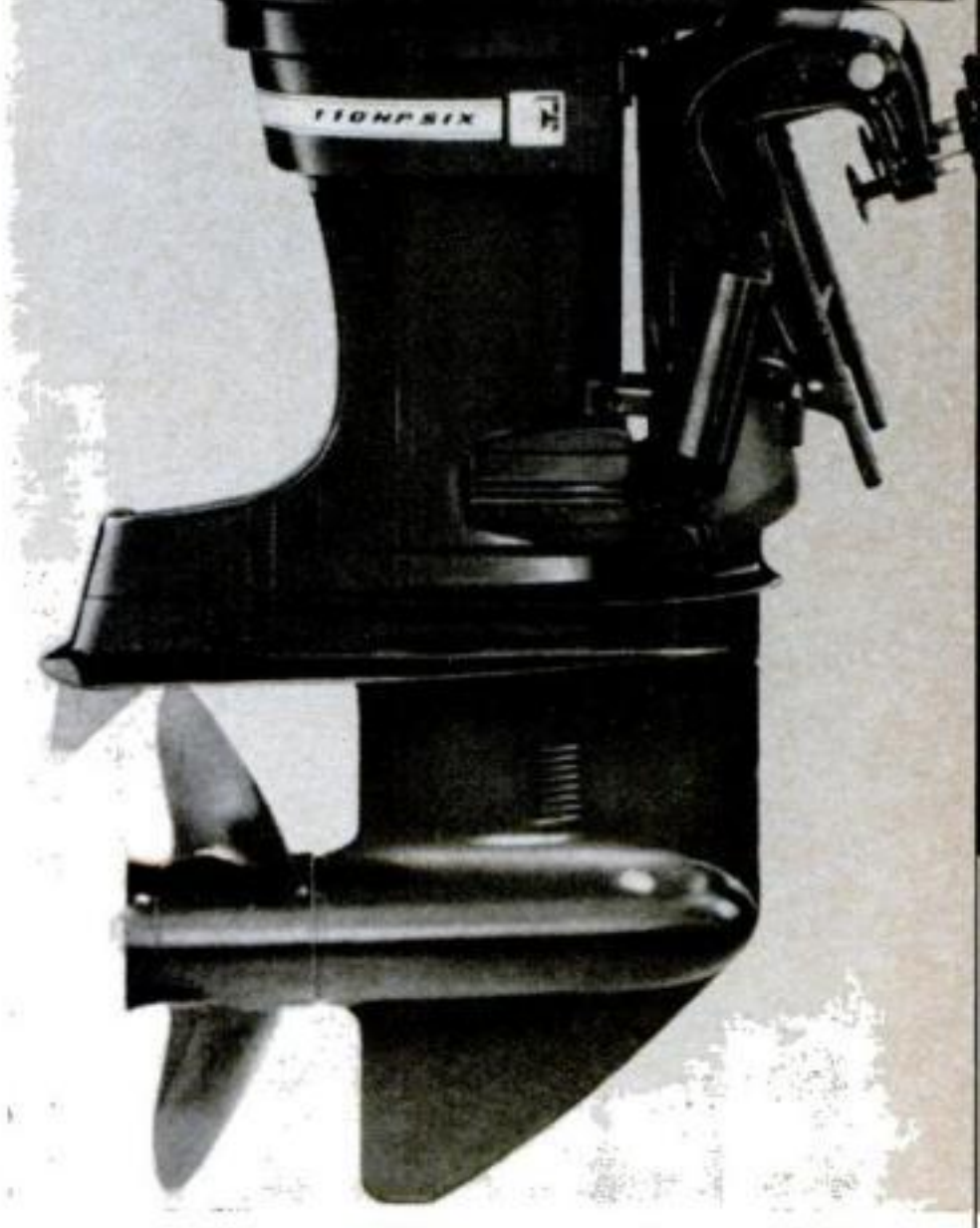
two-cycle one-cylinder power head is an adaptation of McCulloch's widely used chain-saw engine. It weighs only 37 pounds, is 39 inches high, 8 wide and 16 deep. With an operating range of 3,200 to 3,800 r.p.m., the motor idles down to a slow 450 r.p.m. It also features a loop scavenging system of intake-combustion-exhaust. This system is said to allow the piston to run cooler and make the rings longer lasting.

***What's new at Homelite.*** For its new models, Homelite continues to feature the only four-cycle outboard engine. This means you burn gasoline only, with oil in a separate automotive-type lubrication system. There are two models of the 55-hp. motor: the Grand Prix and the Deluxe. Both have thermostatically controlled cooling, and a 20-amp alternator for lights and electrical equipment.

***What's new at Montgomery Ward.*** Sea King motors for 1966 will continue to feature styling that goes well with the boat of your choice. A 35-hp. electric-starting model will be added in both regular and long-shaft models. The nine-hp. is now officially rated at 9.2 hp.

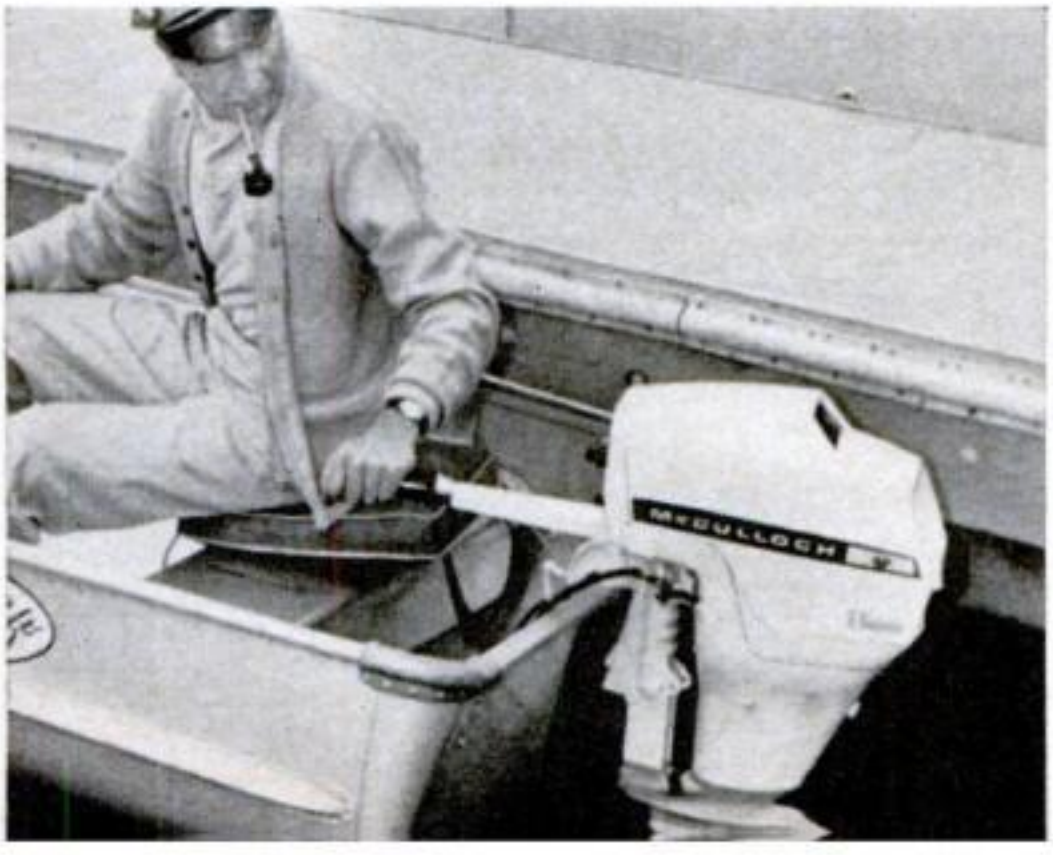
Stalwart of the Sea King line is the 50-hp. two-cylinder motor. With a displacement of 44.7 cubic inches, it pushes average boats at speeds up to 35 m.p.h. It comes with electric starting, thermostatic cooling controls, and electric choke.

***What's new at Sears.*** The new Ted Williams nine-hp. electric-starting motor will be good news for fishermen. It is the smallest and lightest motor in its horsepower category, according to Sears engineers. And the new electric-starting system makes it extremely handy. The motor is started by pushing a button at the end of the twist-grip handle. A power-tilt drive allows fishing boats to operate in very shallow water without prop damage. The motor also includes a built-in generator for recharging the external battery, and an auto-bail device that will bail up to 300 gallons per hour from the boat bottom. ■ ■




**MERCURY** **Horsepower champ** of the world, new 110-hp. Merc is the most powerful production outboard ever produced. Quiet-running, the 93.5-cu.-in. Merc 1100 produces more horsepower per cubic inch and more horsepower per pound than any other outboard. Mercury has had the most powerful outboards since 1954.

right) has electric starting. It weighs 53 pounds and has a generator. There is forward, neutral, reverse shift. Starting switch is built into the end of the twist-grip throttle.






Urheberrechtlich geschütztes Material

**what's new** in BOATING

## Raft Springs From Small Pack

This four-man life raft folds into a compact 8-by-10-by-23-inch package beneath the gunwale (above), inflates with a tug on a lanyard. The rubber-covered nylon raft will support 1,000 pounds, sells for $198.50. New for small-boat owners, it is one of six sizes available from Winslow Co., Venice, Fla.

### Trouble-free lights for your trailer

Tail, stop, and turn lights—plus space for a license plate—make up the Trailer-Lite system designed to be fastened to the stern of a boat in transit. Mounted on an enameled tube, the system includes 35 feet of four-wire connecting cable. It's made by The Thompson Co., Troy, Ohio, sells for $27.50.

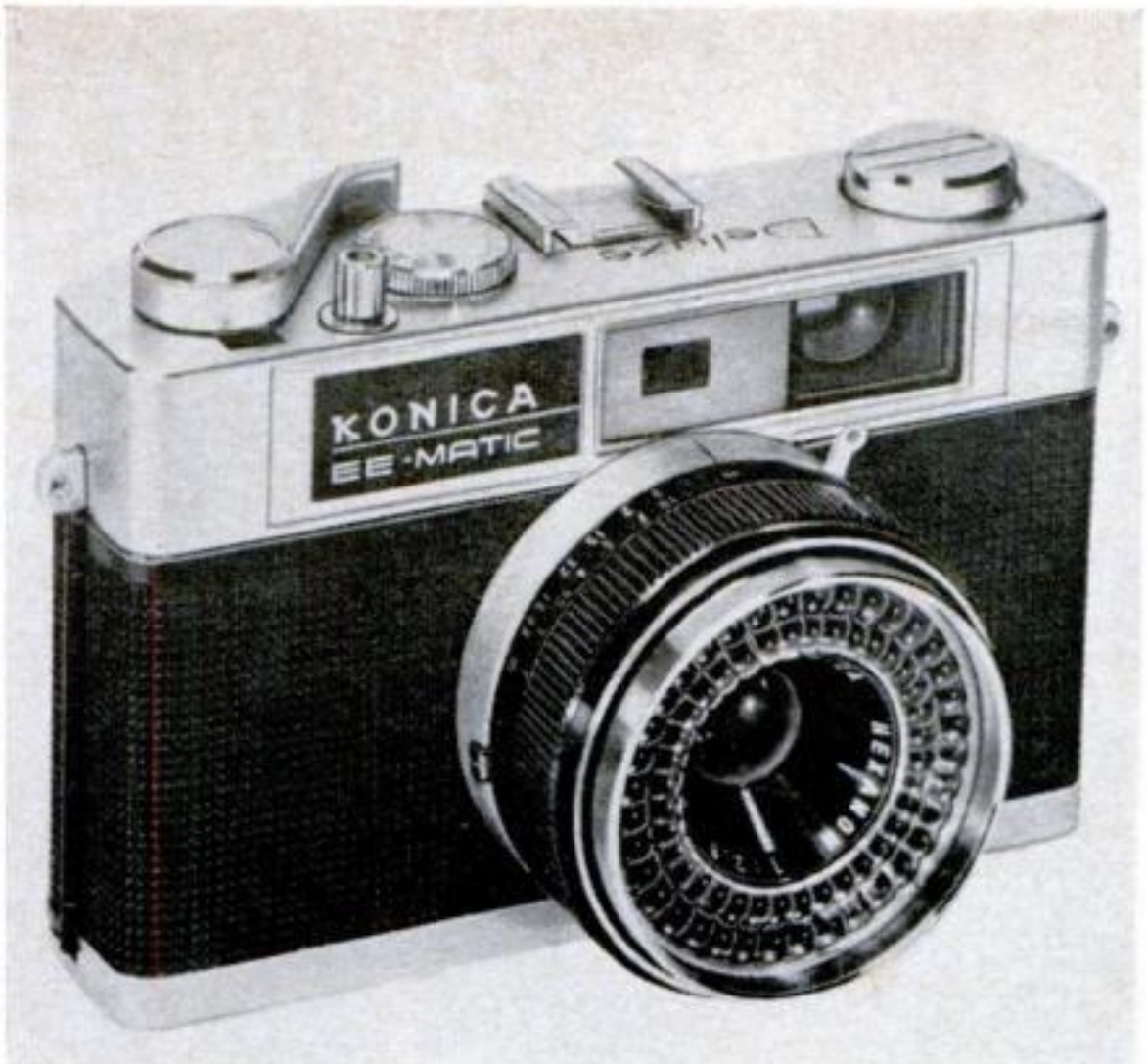
### Here's something new—a bow gas tank

Tailored to fit the bow, this tank nicely trims out smaller inboards and outboards by adding weight up front. The 18-gallon unit shown is 8¼ inches high, 23 deep, and flares from eight inches to a 38½-inch rear width. By Tempo Products, Cleveland, it weighs 36 pounds, sells for $69.50.



Urheberrechtlich geschütztes Material

# what's new in PHOTOGRAPHY

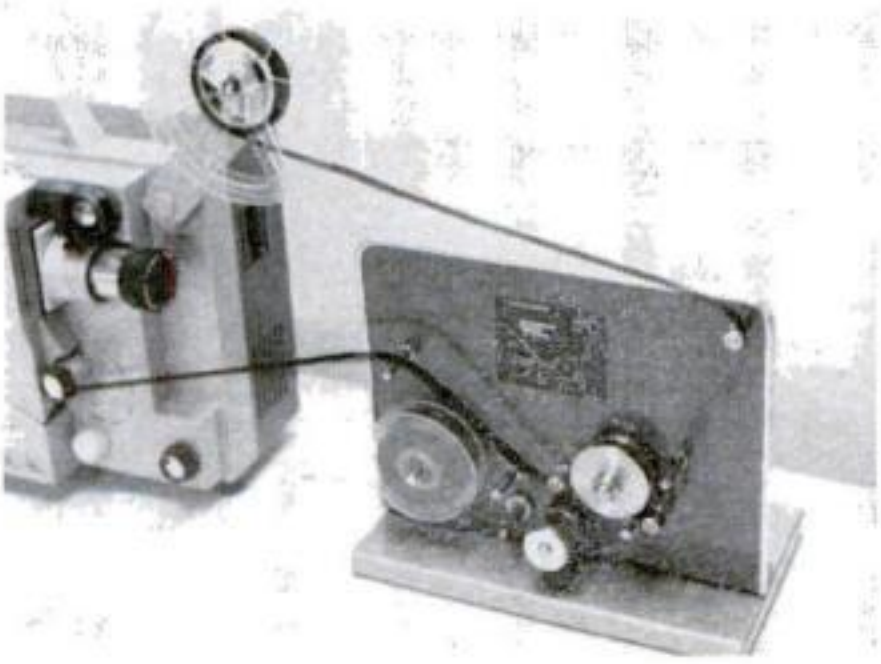



## New 35mm with ring meter

Just focus and set the aperture for the new Konica EEmatic DeLuxe, and the camera does the rest. The shutter speed (set automatically) appears in the viewfinder. Not enough light or too much light? A red no-go signal in the viewfinder tells you, and the shutter release locks. Exposure can also be controlled manually, if you want to do without the camera's help. The ring meter around the lens automatically compensates for filter factor, since it's behind the filter. Cost: about $80.

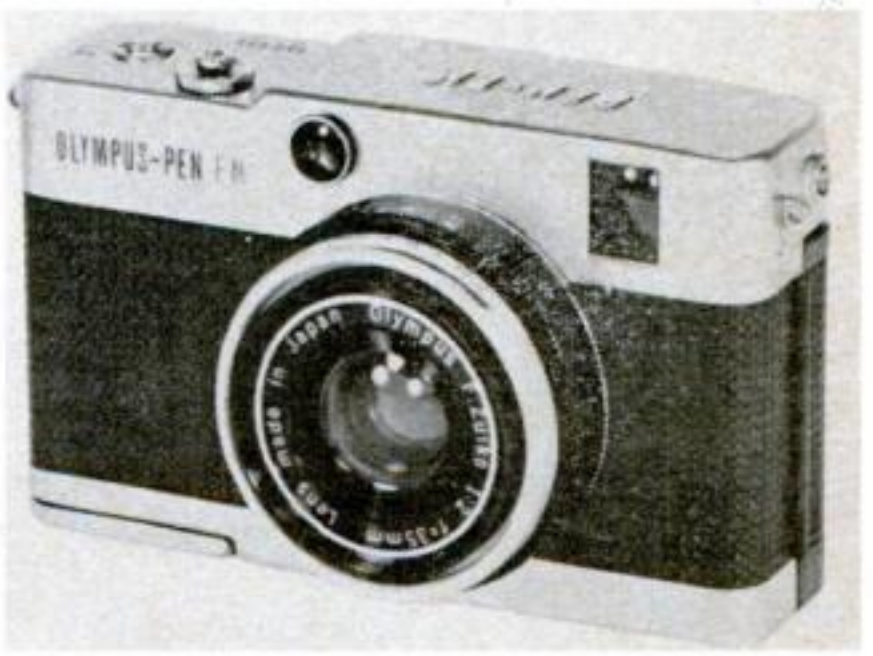
## Sears Super 8 camera has through-lens exposure

Super 8 has come to Sears, Roebuck, and the result is three new cameras, two projectors. Top-of-the-line camera (above) has motorized zoom, slow motion, through-lens automatic exposure and viewing. About $180.



## Striper converts home movies for sound

Using the take-up reel of your standard 8mm movie projector for power, this British machine cements on a sound stripe. The stripe moves over a felt wick that holds quick-drying liquid cement, then onto a grooved guide that aligns it accurately on the film. Harringay Super Striper is distributed by Cinefot, 1 Park Ave., NYC 10016.



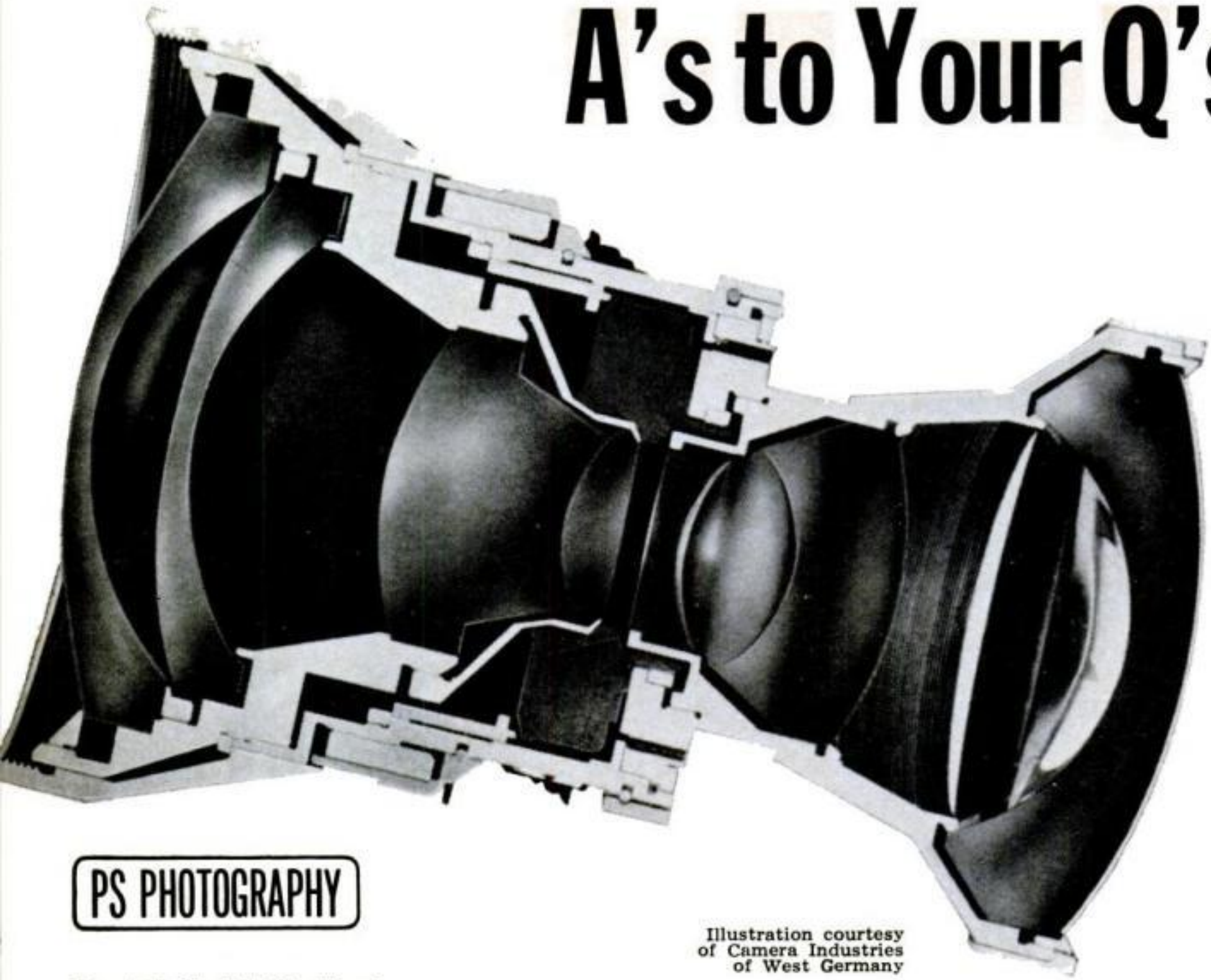

## Electronic shutter snaps at 30-1/500

An electronic shutter on the Olympus Pen-EM half-frame camera automatically sets speeds for as long as 30 seconds, as short as 1/500. A four-transistor circuit amplifies light for the CdS cell, produces proper exposure by a capacitor discharge that activates the shutter-blade magnet. An electric drive transports the film. Cost: $99.95.



Urheberrechtlich geschütztes Material

# A's to Your Q's



PS PHOTOGRAPHY

Illustration courtesy of Camera Industries of West Germany

**By Phil McCafferty**

**Q** ***What do the numbers on the rim of my lens mean?***

**A** Serial number, maximum aperture ("speed"), and focal length. The last two are not always well spelled out. The "1:2.0/50" on the rim of your 35mm camera lens, for example, means that the maximum aperture is *f*/2, focal length is 50mm. (On some lenses it may be written a little differently —say, "1:2 *f*-50mm"). A 50mm lens is "normal" for a 35mm camera.

**Q** ***What does "f" mean anyway?***

**A** The *f* followed by a number is a measure of a lens's relative ability to admit light. Mathematically, *f* is the focal length divided by effective lens aperture.

When photographers talk about the "speed" of a lens, they mean its *f* number at maximum aperture. The smaller the number, the more light the lens admits, and hence the faster the shutter speed they can use. By transferral, they thus speak of a "faster" lens. A lens with a maximum aperture setting of *f*/2 is "faster" than an *f*/2.8 lens.

Each full increment the aperture opening is reduced in size, or "stopped down," halves the amount of light coming through the lens and reaching the film.

The stops are not linear (they are actually the square roots of relative-exposure numbers) and the system is pretty confusing to many camera fans. Full "stops" are: *f*/1.4, 2, 2.8, 4, 5.6, 8, 11, 16, 22, and 32. Numbers in between these on a lens very likely are "half stops."

**Q** ***How come my new 35mm camera's lens only stops down to f/16? My old camera stopped to f/32.***

**A** But your new lens is faster than the old one, too—right? Designing a lens involves compromises to achieve important features like high speed. That's why the lens maker



Urheberrechtlich geschütztes Material

# About Camera Lenses

lopped off the small end of the aperture range.

There are certain aperture openings at which each lens performs best, usually about two or three *f* stops from wide open. Shoot either side of this range and sharpness falls off. Commonly, the more you stop down, the less sharpness you get.

Your old lens—*f*/4 when wide open, perhaps—did best at maybe *f*/8 to 16, and was still pretty good at *f*/32. But the sharpest pictures with a fast *f*/1.4 lens usually come at settings of 2.8 to 5.6 or so. Shots beyond *f*/16 probably would be pretty fuzzy. It is common to design the lens so you can't stop it down to where it could disappoint you.

**Q** ***What is meant by a "normal" focal-length lens? For that matter, what is focal length?***

**A** Each size camera has an accepted "normal" lens—one that gives a view pleasing to most people. It works out to be about the diagonal measurement of the negative. For 35mm cameras, this rule assigns a normal lens focal length of 45mm (though most come with lenses around 50mm); for 2¼-by-2¼, 80mm; and for 2¼-by-3¼, 100mm.

Focal length is the distance from the center of the lens system to the film when the lens is focused at infinity (sketch below).

The shorter the focal length, the wider the angle of view—and hence the smaller any given object on the film. It's directly proportional, too. Photographed from the same distance, objects taken with a 50mm lens will be exactly half the size on the film as with a 100mm lens.

**Q** ***What do they mean by "depth of field"?***

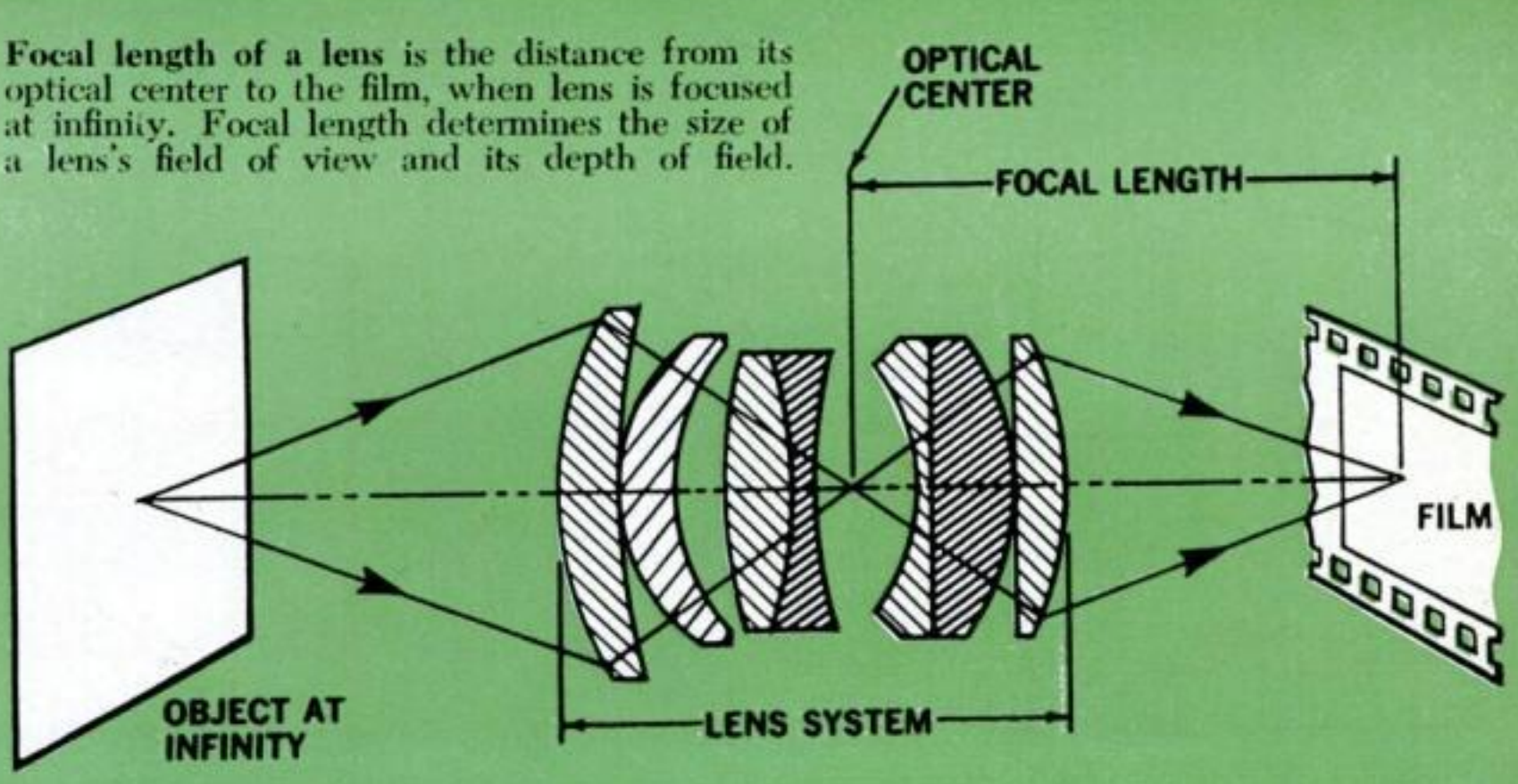
**A** Each *f*/stop on a lens has a particular zone of sharp focus. The distance between the nearest and farthest objects in that zone is the depth of field. It increases as you stop down, decreases as you open the lens. The closer the object you're focusing on, the smaller the depth of field. That's why, when you shoot close-ups at large lens openings, you must focus with special care.

**Q** ***A friend says his fancy lens has greater depth of field than mine. Is that possible?***

**A** If you both have lenses of the same focal length on the same size camera (regardless of brand or quality), depth of field

CONTINUED

**Focal length of a lens** is the distance from its optical center to the film, when lens is focused at infinity. Focal length determines the size of a lens's field of view and its depth of field.






Urheberrechtlich geschütztes Material

## Were the pictures from your old $2 box camera sharper than

is the same. Lens quality, or the care with which he shoots, develops, and prints, could give him sharper results, however.

**Q** ***I've heard that wide-angle lenses distort. Is this so?***

**A** Cheapie wide-angle lenses often distort (curve straight lines) or otherwise mess up the image toward the edges of a picture. Even a good one may appear to distort because, with its wider angle of view, it can compress more onto film than we are accustomed to accepting. Objects in the foreground can appear abnormally large or misshapen in relation to the background.

**Q** ***Sometimes pictures taken with my regular lens seem distorted. Something wrong?***

**A** It is pretty hard to find a standard normal-focal-length lens that will cause appreciable true distortion.

"Sometimes" makes me suspect you see this effect only when there is something obvious, like a building, in the picture. The finest lens made will cause convergence of any parallel lines that are not parallel to the camera (illustration below).

Cameras with tiltable lenses and/or backs can correct for this, and compensations can be made in enlarging a negative. But when converging lines would be objectionable in a picture, try to pick a position where the camera will be parallel with the most important lines of the scene.

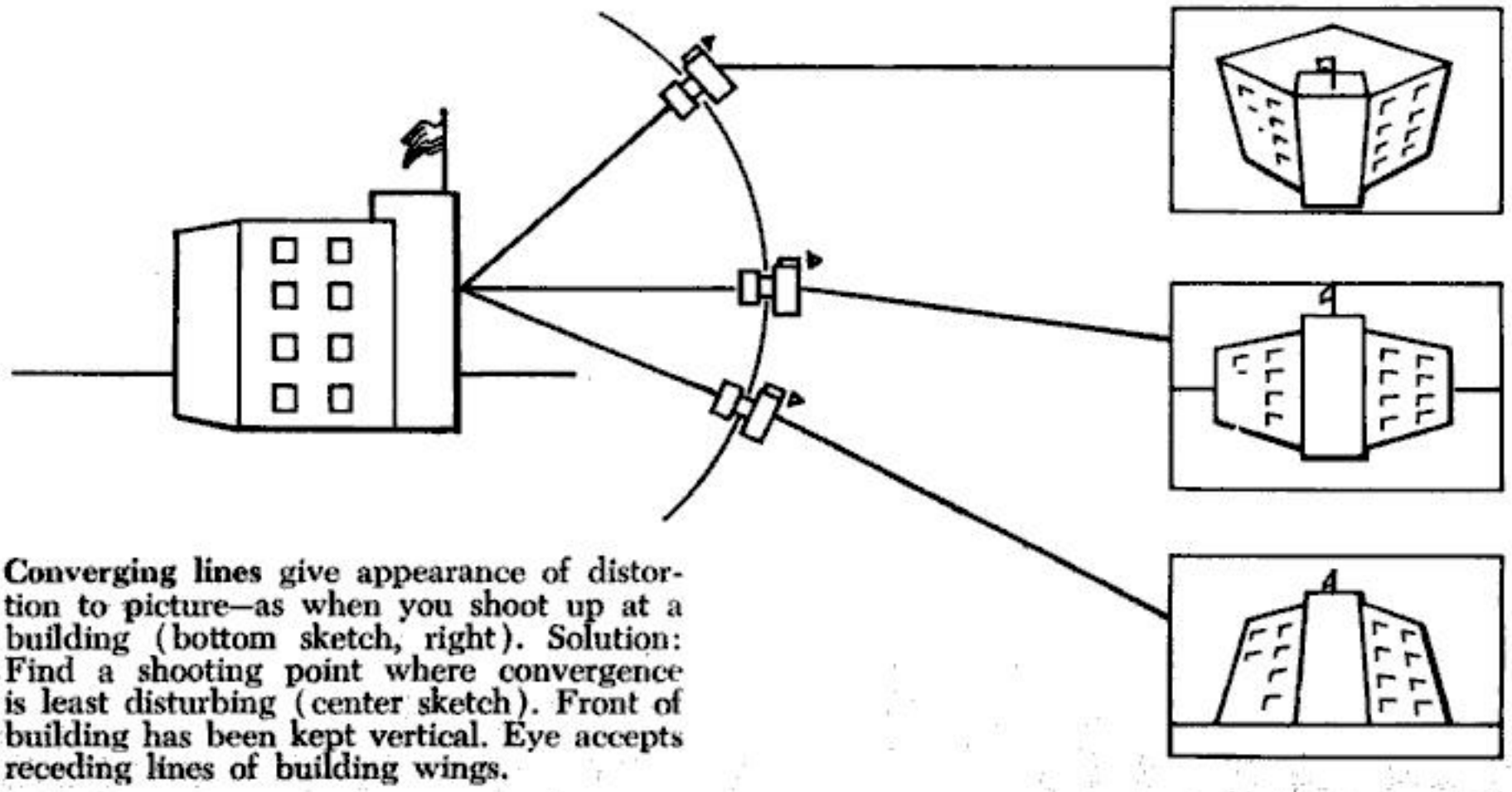
**Q** ***I focus my 35mm single-lens reflex carefully, yet get some fuzzy slides. Focusing through the lens, how can I goof?***

**A** Through the lens, yes; but the image you see, on most 35mm SLRs, has been diverted via a mirror that flips up out of the way when you fire the shutter. If this mirror is not adjusted properly (a minor job for a qualified camera repairman), what you see through the eyepiece may not match the picture on the film plane.

To test your SLR, shoot some photos of a fairly close object with the lens wide open, and check the results for accuracy.

**Q** ***I have interchangeable lenses (same brand) for my SLR. The telephoto lens is less sharp; my slides are bluish. How come?***

**A** With a telephoto lens, you are magnifying atmosphere that often contains water vapor and dust—sharpness-reducing and bluish in color. Camera movement is mag-



**Converging lines** give appearance of distortion to picture—as when you shoot up at a building (bottom sketch, right). Solution: Find a shooting point where convergence is least disturbing (center sketch). Front of building has been kept vertical. Eye accepts receding lines of building wings.



Urheberrecht ch geschützt Material

nified, too—another factor in unsharpness.

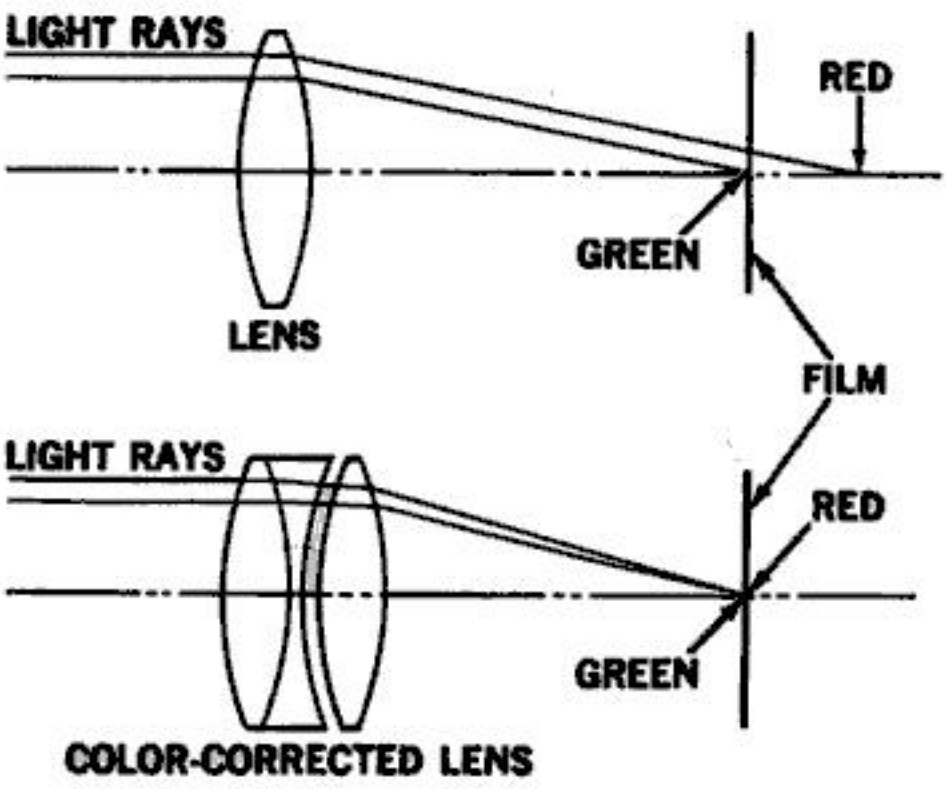
With a tripod, shoot a subject like a brick wall with the telephoto lens, then move closer and shoot the same area with the normal lens. Chances are there will be little difference in sharpness or color quality.

**Q** ***I've been warned not to try color film in my older camera because it probably does not have a color-corrected lens. Should I go ahead, anyway?***

**A** Color correction is an optical correction engineered into many lenses long before color photography was generally popular. Different kinds of glass in different lens elements are often used to selectively bend the rays of different colored light so that more of them converge sharply at the same point on the film (see illustration below). Without the correction, black-and-white shots, as well as color, could be unsharp.

If your old camera has a good lens, it's well worth the price of a roll or two of color film to try it out.

**Q** ***I think I got sharper pictures years ago with a $2 box camera than I often get with my expensive 35mm with topnotch lens. Am I imagining things?***




**Color-corrected lens** bends light rays of different color (wave length) to sharp focus. Uncorrected lens yields fuzzy pictures.

**A** Maybe not. A lens doesn't have to be expensive to be good (a lot of new, inexpensive cameras have cast plastic lenses) until you make it fast and adjustable.

Your good-old-days box outfit forced you to shoot at a fixed, optimum *f*/stop. That, and little film choice, made you adhere to good exposure rules and easy subjects. Negatives were nearly as large as your hand.

Now you can focus (maybe inaccurately), shoot at slow shutter speeds (risking camera shake) with a fast, wide-open lens (and a narrow range of scene in focus), and abuse the film speed (overexpose, producing fogginess and grain).

Compound these opportunities for error with the needed five-times-or-so enlargement (magnifying film grain and unsharpness) to get a picture the same size as the box-camera's contact prints. Obviously you may not be imagining things at all.

**Q** ***I'd like to try some portraits. Do I need a portrait lens?***

**A** A lens longer than normal focal length —in the 70mm to 90mm range for 35mm cameras, for example—is often preferred for portraits. You can cover the head and shoulders from a greater distance. This allows more room for lights and helps put the subject at ease. And a longer lens gives a more pleasing perspective to an arm, shoulder, or hands extending toward the camera (perspective distortion again).

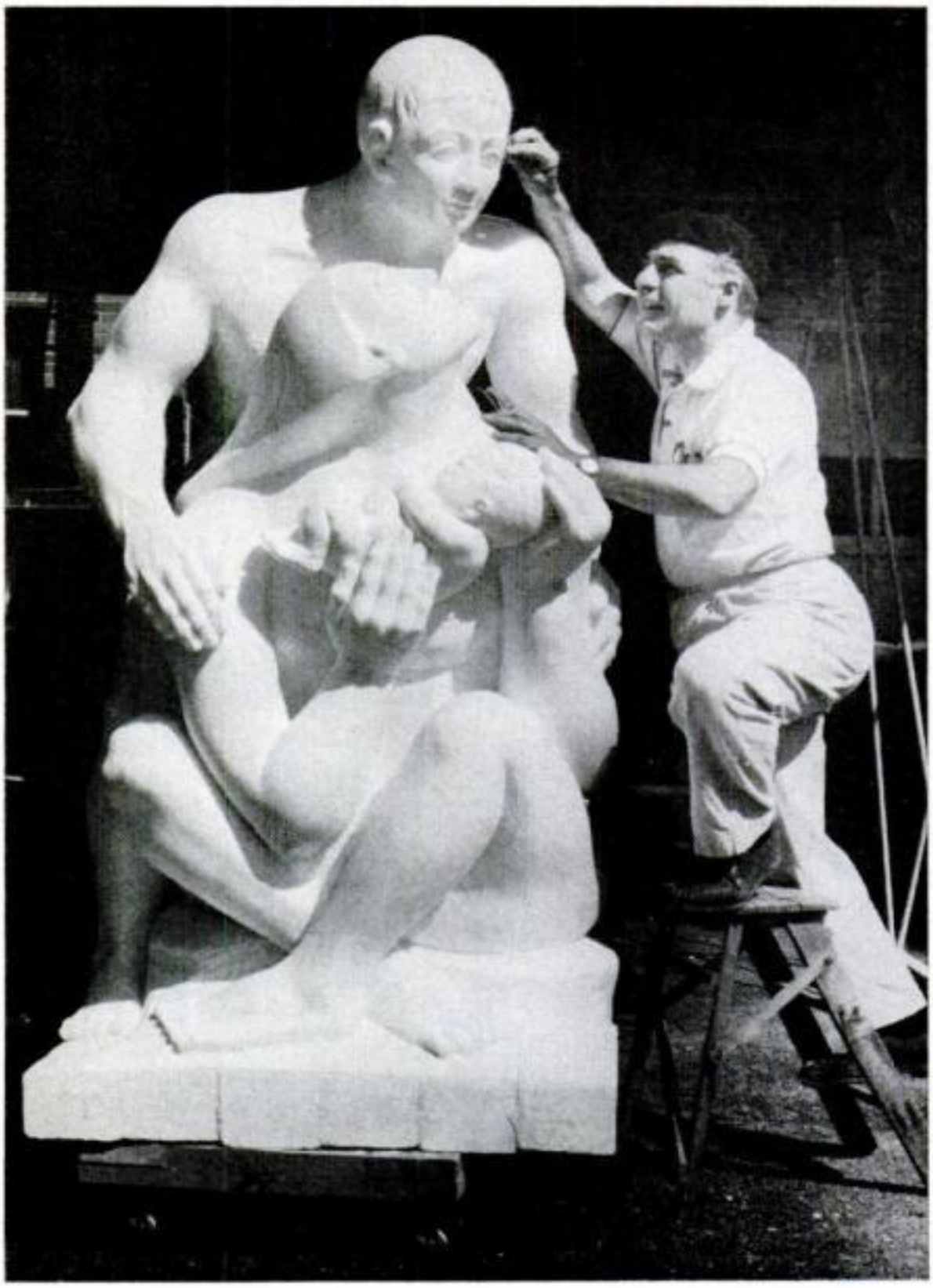
Some pro portrait lenses have special diffusers built in to ever so slightly veil sharpness. This gives a pleasing softness to the portrait. To simulate this effect, you might try stretching a sheer nylon stocking over your lens or coating the outside lens surface very, very lightly with a thin grease such as vaseline.

**Q** ***Is there some way I can be sure of getting a good lens when I buy a new camera?***

**A** You could have it tested, but practically speaking you'll stand an excellent chance of getting a good one by sticking with a known brand and buying from a dealer you feel is trustworthy, and who will exchange it if the lens or anything else is not up to your expectations. ■ ■



Urheberrecht ch geschützes Material

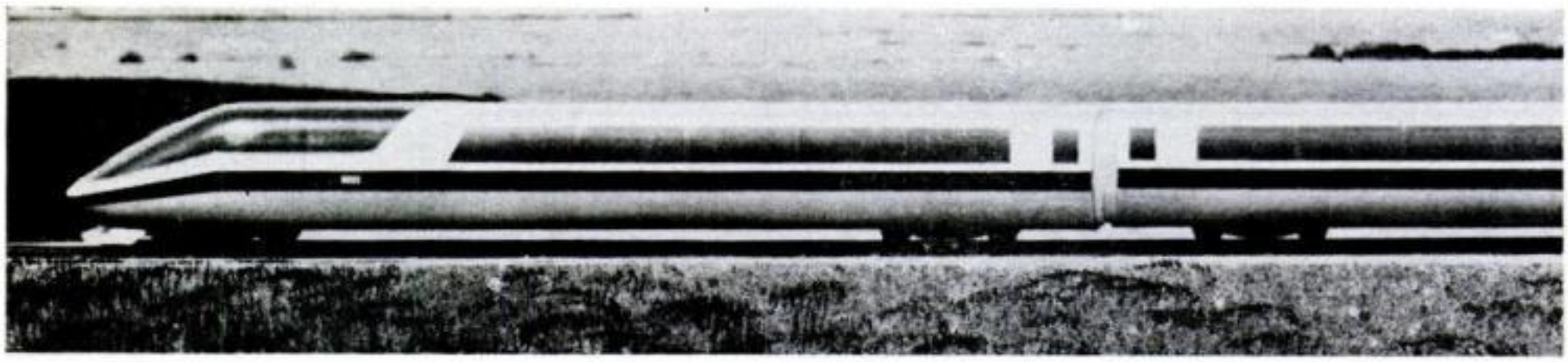


**Huge block** is glued up from six eight-inch slabs three feet in width and six feet in length.

**Monumental statue** (left) looks like marble, actually weighs only six pounds a cubic foot.

## Giant statue is carved from a block of plastic foam

A new art material that cuts as easily as balsa, will not splinter or fuzz, has been developed from rigid urethane foam—a resin used for refrigerator insulation. With chisel marks smoothed by a file or abrasive stone, finished statues resemble marble, won't rot, check, or chip, and age with time to a beige to brown tint. The plastic foam is made by Du Pont for Artfoam, Inc., Hicksville, N.Y.

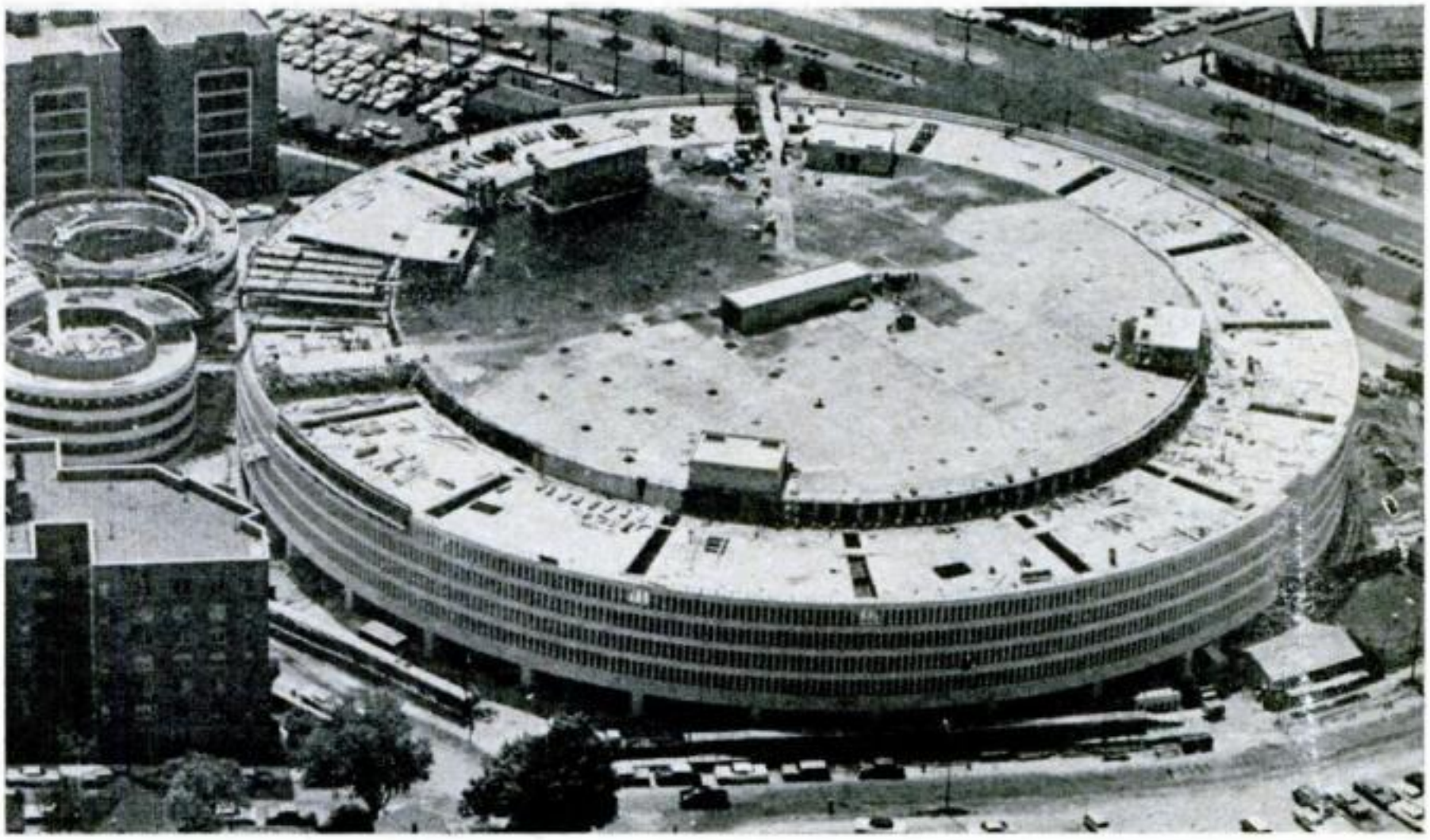


## Superspeed passenger train planned to run 160 m.p.h.

A smooth-riding superspeed train that will reach 160 m.p.h. is proposed to meet President Johnson's recommendations for faster travel between Washington, New York, and Boston, and in other crowded areas. The Budd Co., designers of the train, say that it can be ready as soon as the railroads can prepare the tracks. The luxury train would



Urheberrechtlich geschütztes Material

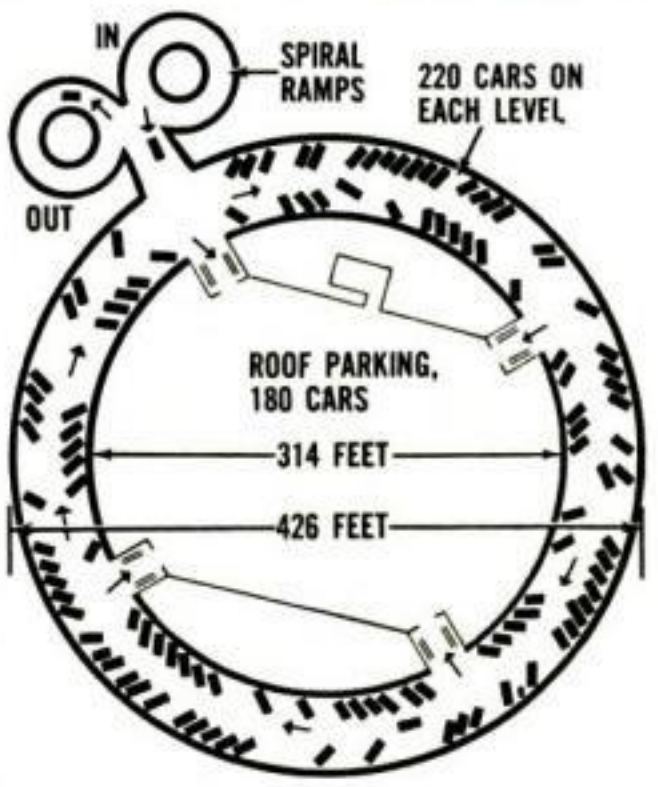


**Circular parking decks** surround shopping core of store under construction. Cars reach them by the spiral ramps at left.

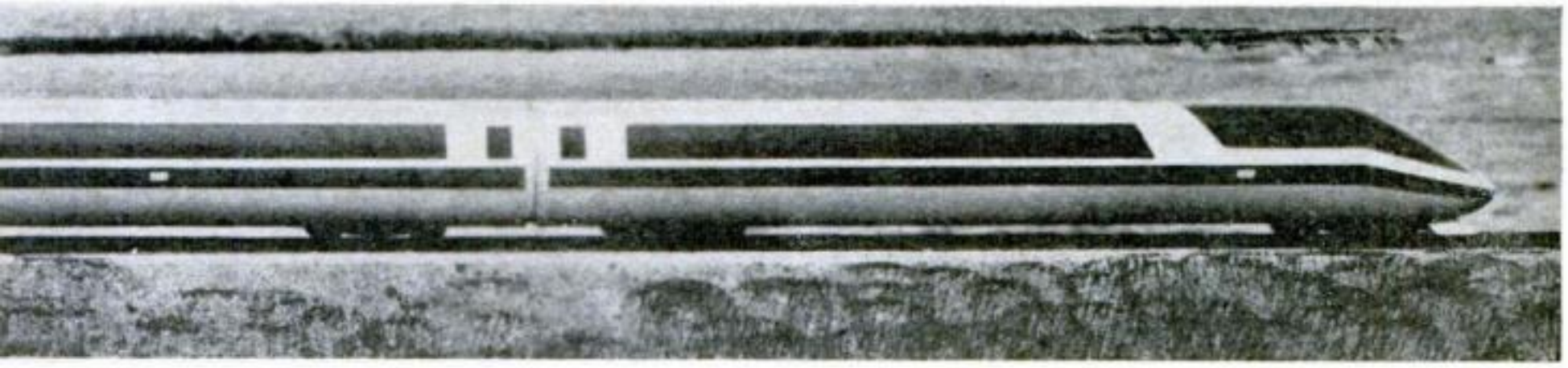
## Doughnut parking decks encircle store

When Macy's new department store in New York's congested Borough of Queens opens this fall, it will offer parking for 1,500 cars within 125 feet of any shopping area. Six circular parking decks, holding 220 cars each, surround a three-story shopping core. Decks are reached by two spiral ramps that allow customers to park on the level nearest the department they want. The roof holds 180 more cars. The ramps, at one side of the store, are linked to each parking level by a bridge. The parking rings are 56 feet wide and are designed for angle parking. A computer directs customers to parking places.

The circular layout was decided on as more logical than flat parking, which would take more space and make customers walk farther to and from the store.




**With store doors 250 feet apart, farthest car is 125 feet away.**



be powered by gas turbines or electric engines, would run in 10-car units during peak hours and two-car units at other times. They would be practically noiseless, accelerate and decelerate faster than present trains. Passengers in airline-type reclining seats would "ride on air" with highly advanced shock absorbers eliminating contact between wheel assembly and car. Meals would be served to passengers at their seats.



Urheberrechtlich geschütztes Material

# What Makes Stan Musial

## A great baseball player lets you in on the secrets behind his remarkable 21-year record of skill and endurance

By Bob Broeg



Bob Broeg, sports editor of the St. Louis *Post-Dispatch*, with Stan the Man prior to a Cards game.

Urheberrechtlich geschütztes Material

# THE MAN

THE night his grandson was born in 1963, Stan Musial clouted a home run to help the St. Louis Cardinals clinch a victory in a close pennant race. That season, at 42, he became the oldest man to qualify for a major-league batting championship with a .330 average in 135 games.

During his phenomenal 21-year major-league career, Stan The Man made more total bases than any other player in the history of baseball, despite a chronic knee injury that plagued him most of the time.

How did he overcome this handicap and compile his great record? Stan credits a rugged physical-conditioning program that began when he was nine years old and continues to this very day.

**Musial hoists** his physical-fitness mentor, Walter Eberhardt, aloft to demonstrate one of the ways in which he keeps fit.

Musial now travels around the country preaching what he still practices in his post as special consultant to the President's Council for Physical Fitness. He feels he has made progress in his efforts to encourage fitness in the interests of national safety and personal health. But this pleasant man is grim when he talks about what still needs to be done.

"Only six states have adequate fitness programs in their school systems," he says, "and just one—California—really has the daily one-hour physical training that should be required everywhere. I don't think it's any coincidence that California has provided the most and best Olympic athletes in the country."

Musial emphasizes that he is not proposing any academic compromise to favor physical training. "But without detracting from studies, an hour a day of physical activity in school is essential because kids don't get it at home.

"When parents aren't driving their children around, school buses are. And most kids spend too many hours before the TV set. Doctors tell me that too many sedentary youngsters are coming up with adult ailments—ulcers and eye trouble, for instance."

***Starting young.*** Musial's belief that physical fitness starts in the home is based on his own boyhood. His father, who wrestled 100-pound bundles of wire into freight cars at a wire mill, had the Old World regard for physical fitness. From the time Stan was nine, he was sent three afternoons a week to the Polish Falcons, a turnverein (gymnastic) and social club.

For three years, young Musial marched, drilled, and took organized gymnastics. He learned to swing on the parallel bars and rings, vault over the long and short horse, and to tumble gracefully.

"I didn't realize then how lucky I was," Musial says, "but I'm grateful now for the work on the apparatus and the mats. I know it improved my coordination and gave

CONTINUED 127

Urheberrechtlich geschütztes Material

**The Man** gives his younger daughter, six-year-old Jeannie, instructions on how to do pull-ups in the basement of the Musial St. Louis home.

me both greater strength and durability."

The Cardinals' trainer, Bob Bauman, says the way Musial developed his chest, shoulders, and back as a boy was the secret of The Man's hitting power.

In addition, Musial had the "highest tolerance for pain of any athlete I've ever trained—what I'd call contempt for pain," Bauman says. The trainer recalls one game when Musial, already past 40, was bothered with a pulled leg muscle and a cold. Then he developed an abscessed tooth.

"He played," Bauman recalls, "hit two home runs against the Giants, drove in seven runs—and then rushed out of the ball park to keep an emergency midnight date with his dentist."

The Cards' surgeon, Dr. I. C. Middleman, says Musial made the "most amazing athletic convalescence I've ever seen." In August, 1957, Musial swung awkwardly at a pitch. He yanked his left arm out of joint, fractured the bone of the shoulder socket, and tore most of the heavy muscles over the collarbone and shoulder blade. Musial didn't agree with doctors who said the injuries would sideline him for the rest of the season.

Only 16 days later, Musial pinch-hit a single to start a game-winning rally. He then returned to regular play and collected 16 hits in 31 times at bat to improve his league-leading average from .340 to .351.

That fall, X-rays still showed evidence of incomplete healing in the shoulder. He played on.

"Musial has a high pain threshold because he never let success soften him," says Dr. Middleman.

But Musial believes that he did let himself get a bit soft twice, and the experiences deepened his current resolve to keep himself always in trim.

[*Continued on page 196*]

## Stan Musial tells you what you can do to keep fit

The President's Council on Physical Fitness, headed by Stan Musial, recommends a basic 25- to 30-minute workout for the average man, at least three days a week and preferably every day.

After a medical clearance, begin gradually with a few exercises of moderate intensity, easing off at any feeling of discomfort.

Recommended are:

1. Warm-up (five to 10 minutes)—stretching, walking, or easy jogging, deep breathing.
2. Flexibility exercises (five minutes)—for limbering the lower back, hamstrings, body joints (shoulders, knees, hips, neck, elbows, and ankles).
3. Major muscle-group exercises (10 minutes). For the larger muscles, here are some sample exercises:

- **For the legs**—running, half-knee bends, jumping, side leg raises.
- **For the abdomen**—sit-ups, sitting kicks, leg raises.
- **For the chest**—push-ups and some weight-lifting exercises.
- **For the back**—prone arch, pull-ups, wing stretcher, weight-lifting exercises.
- **For the arms**—push-ups, arm circles, pull-ups, weight-lifting exercises.
- **Heart-and-lung system**—running, squat jumps, sprinter jumps.

4. Tapering-off exercises (five minutes)—walking, stretching, deep breathing.

Details on the exercises, prepared by the President's Council on Physical Fitness, are available from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. The publication, "Adult Physical Fitness," costs 35 cents; "Youth Physical Fitness" is 40 cents.



Urheberrechtlich geschütztes Material

# One-Handed, Two-Eared, Hi-Fi Microphone

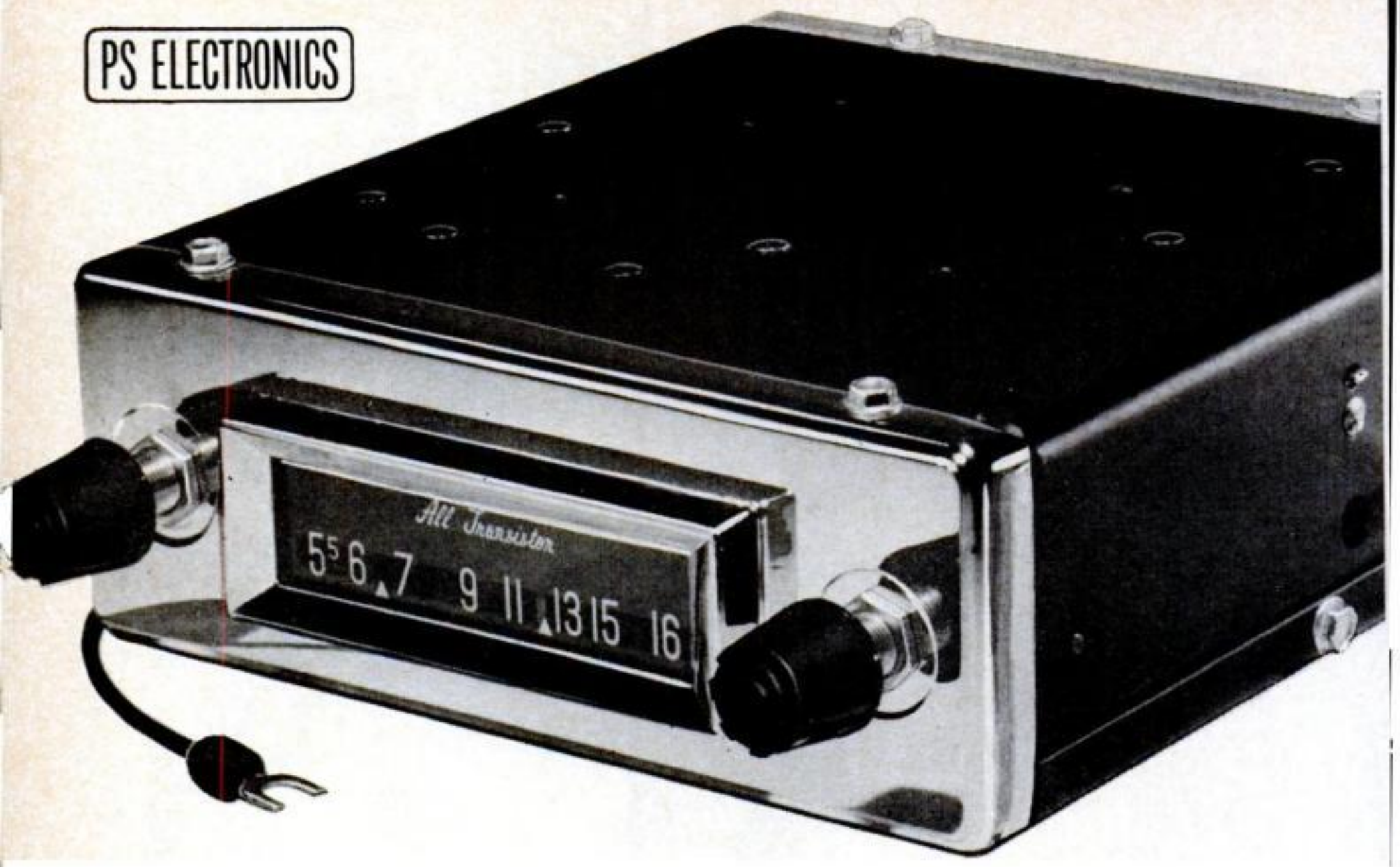
ONE B & O stereo mike can replace the two conventional mikes normally required to make a "live" stereo tape recording. The foot-long unit generates both left and right channel outputs. Its secret is a pair of high-quality "ribbon" mike elements on a common handle. The degree of stereo separation is controlled by rotating the top element with respect to the bottom element. A quarter twist varies it from total separation—for "Ping-pong" stereo effects—to no separation—for monaural recording. Price: $200. Dynaco, Philadelphia.

## First report: Ampex brings out a television tape recorder for the home

It's getting harder to spot the differences between home TV recorders and TV-station-quality machines. The Ampex home videotaper uses a professional-type rotating record/playback head, and records on studio-size one-inch-wide magnetic tape. The videotape unit will record and play back through any TV set. Estimated cost of connecting it is $25. Although the machine will only record black-and-white programs, the tapes will be playable on future color-TV recorders. Price: $1,100.



Urheberrechtlich geschütztes Material




# Now It's Easy to Install

## The money-saving "universal" radios fit most late-model cars.

**By Ronald M. Benrey**

ONCE upon a time, installing your own car radio was a lot like retreading your own tires: hard work that didn't make sense. Store-bought auto radios never looked or sounded as good as factory-installed radios. Today, it does make sense, and it's not hard work. Here's why:

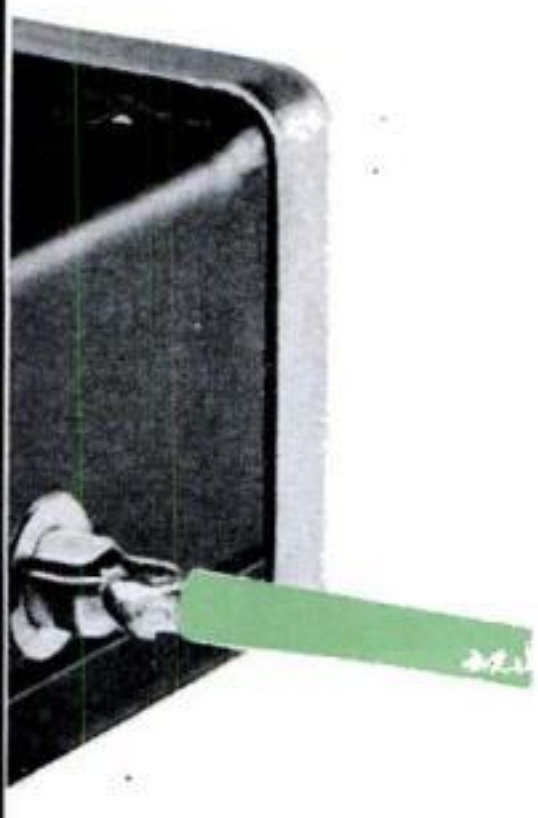
- The days when every make of car used a different—and impossible-to-buy—size and shape radio are gone. New over-the-counter radios usually slip right into the dash of most late-model cars. For unusual dashes—and for foreign cars—below-dash hang-on models are available.
- The store-bought auto radios are top-quality receivers that match the performance of factory-installed units in all respects. Several different models are available, ranging from basic low-cost manual-tuning radios ($30 with antenna; pictured above), to pushbutton tuning models (about $50), to hi-fi AM-FM radios (over $150). You can add rear-seat speakers and power-operated automatic antennas.
- You save money—often as much as $30 to $40 off factory-installed price.
- They are easy to install. Just mount the radio in place, hook up the power lead to the hot side of the car's ignition switch, and plug in the antenna lead. Chances are, the necessary dash holes are already drilled. In radio-less new cars, they are covered with knockout plugs.

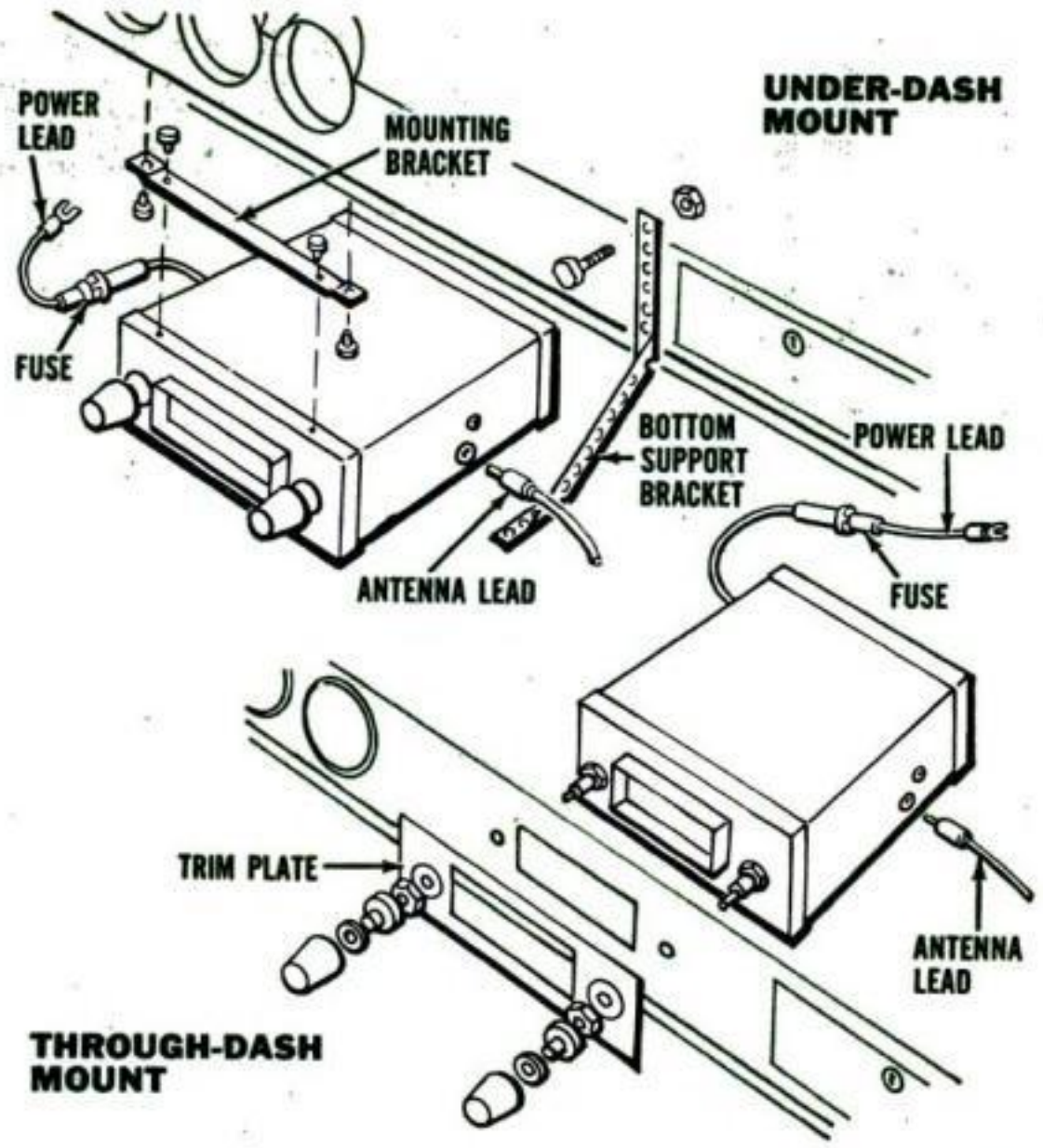
You can buy a car radio from any large mail-order electronics-supply house (such as Allied Radio, Chicago 80; or Lafayette Radio, Syosset, N.Y.) and most automobile-accessory shops.

***Mounting kits.*** Nearly all over-the-counter



Urheberrechtlich geschütztes Material






# Your Own Car Radio

## They look and sound like factory-installed radios

radios are designed to fit most late-model cars. They are available with custom-mounting accessories—including a professional trim plate—for any car. Be sure to specify your car make when you order.

***Speakers.*** The lowest-priced radios have built-in speakers; the fancier models use external speakers like most original-equipment radios. Most newer cars have a space behind the dash for a speaker.

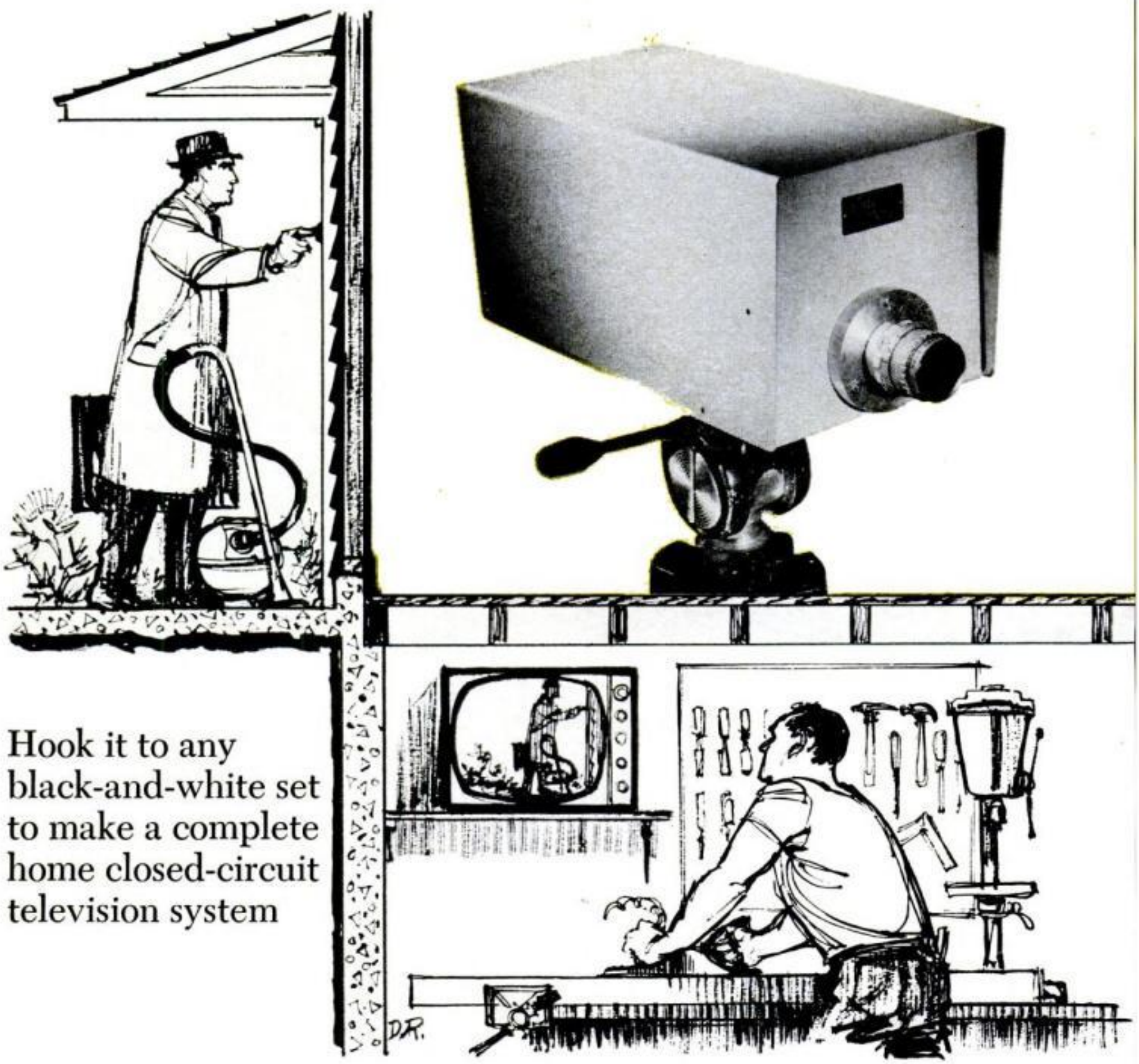
***Antenna.*** To install one, just drill, file, or punch a single hole in a fender. Then snake the antenna lead through any convenient opening in the firewall to bring it inside the car.

**Radio interference** from your engine a problem? Then install the noise-suppression kit (left) supplied with most car radios. All late-model cars use interference-preventing resistance-type spark-plug cable, so major noise sources are probably generator and voltage regulator.

Urheberrechtlich geschütztes Material

## Personal-use report:

# A Real TV Camera



Hook it to any black-and-white set to make a complete home closed-circuit television system

**By Ronald M. Benrey**

THINK it's impossible to be in two places at the same time? So did I, until I built the English-made (Beulah Electronics) Beukit closed-circuit TV camera. With it, I have an extra eye anywhere in my home. Just by hooking up the camera to my black-and-white TV set's antenna terminals, I've got:

- A built-in baby sitter. The kids can play in the yard while my wife or I keep an eye on them from inside the house.
- A front-door monitor. Teamed with my front-door-to-workshop intercom system, the camera becomes an electronic doorman when I'm at work in the basement.

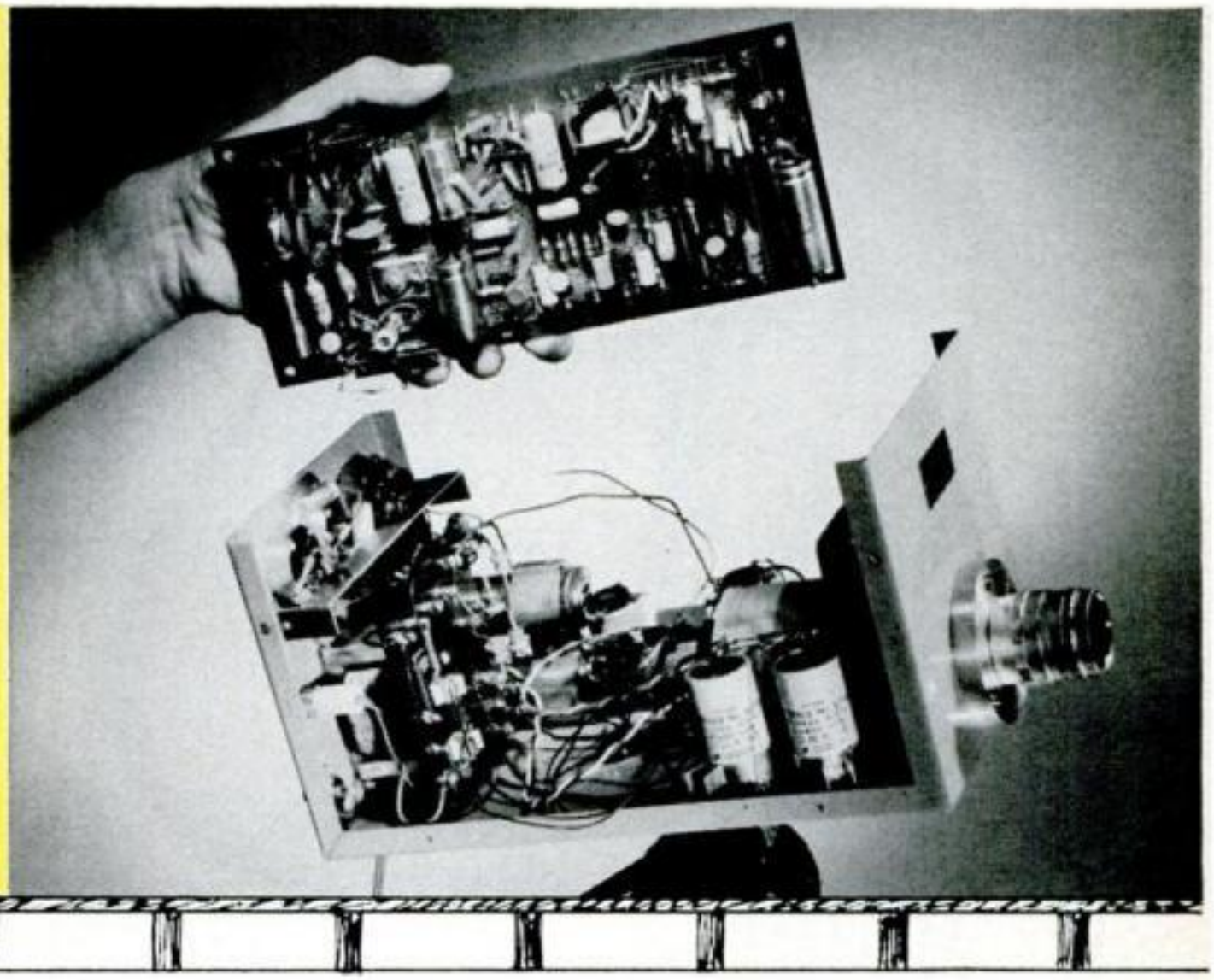
On the less practical side, my camera is great fun at a party, and the kids enjoy using it to produce their own home-brew TV shows.

The kit of electronic parts—complete except for the conventional C-mount 16mm movie-camera lens—costs $200. You can



Urheberrechtlich geschütztes Material

# You Build From a Kit



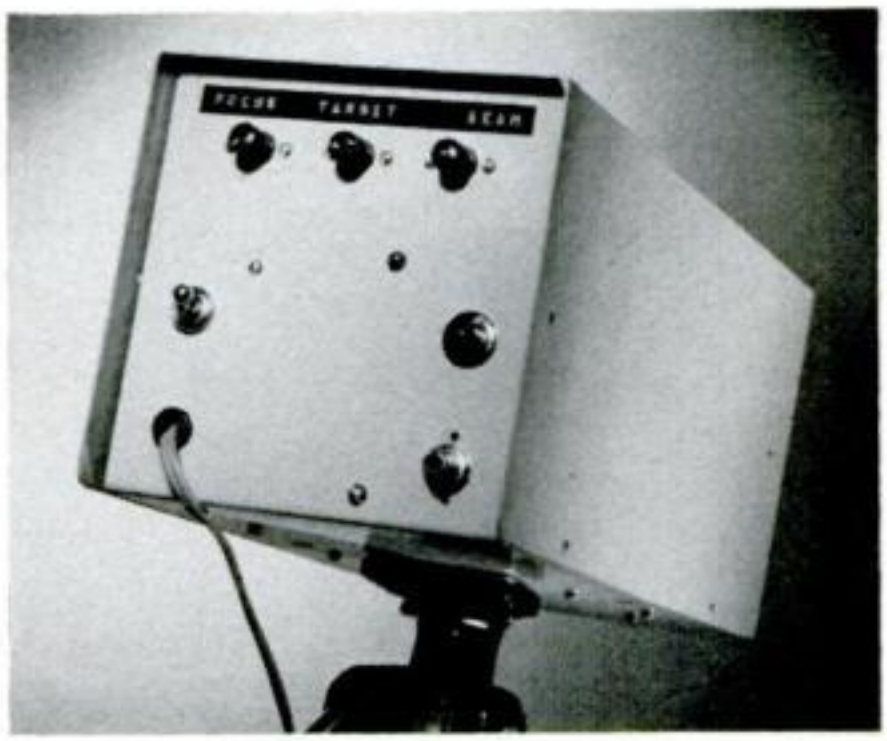
**Critical** video and sync circuits are wired on a predrilled etched circuit board (handheld at right). Component leads are inserted in clearly labeled holes, then soldered to board's copper-foil wiring. The vidicon-tube assembly and power-supply circuits mount in bottom of the steel case. The wiring isn't tricky, but it can get a bit tangled.

get it from PAF Enterprises, Bayonne, N.J.

***Inside the camera.*** A vidicon TV pickup tube converts the scene into a train of electrical signals. These video signals are amplified and combined with synchronizing pulses to make a composite video signal, which is fed to a low-power TV transmitter circuit. The result is a picture signal on channel 3 or 4. It's illegal to broadcast this signal—instead, it's fed to the TV's antenna terminals by coaxial lead-in cable and a coax "matching transformer."

The circuitry is fully transistorized. Picture quality, although perfectly watchable, doesn't match that of elaborate professional TV cameras. The simple vidicon works best picking up a moderately bright scene; very dim indoor shots appear as blurred images on the screen.

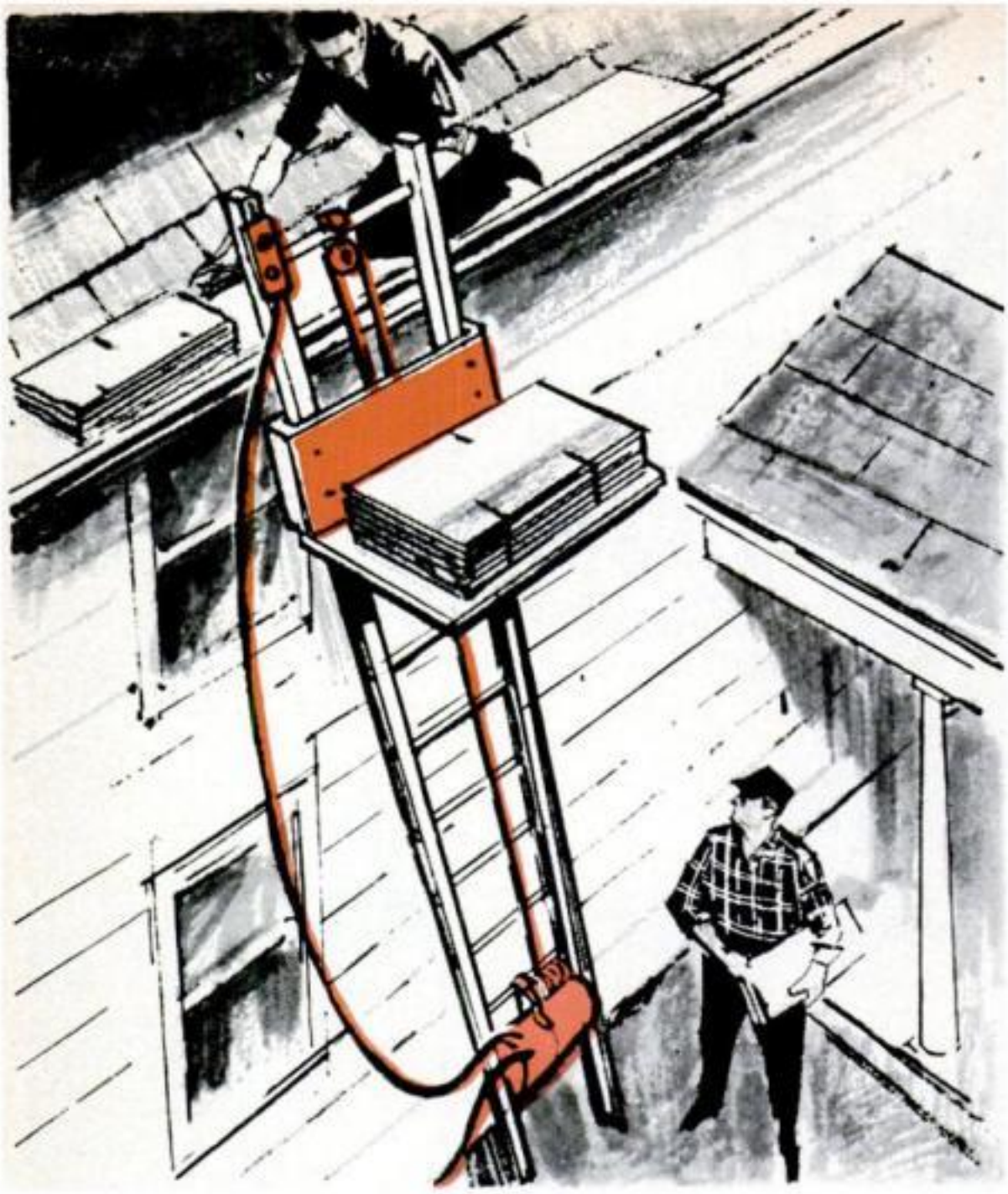
***Building it.*** I spent about 15 hours putting the kit together. Assembly is straightforward, but somewhat more complicated than the average hi-fi kit. There's a lot of wiring to be crammed into a tight cabinet, so it can become confusing. The kit is not for a beginner. The instruction manual is reasonably complete, but the camera was designed for use with British TV sets and a few modifications to the original circuit were necessary. The mimeographed modifications aren't easy to follow, but a hep electronics hobbyist will be able to cope with them and go on to find the Beukit TV camera a project worth tackling.




**Three simple adjustments** control the voltages going to the vidicon TV camera tube to compensate for varying scene illumination. They are set when the camera is aimed and positioned.



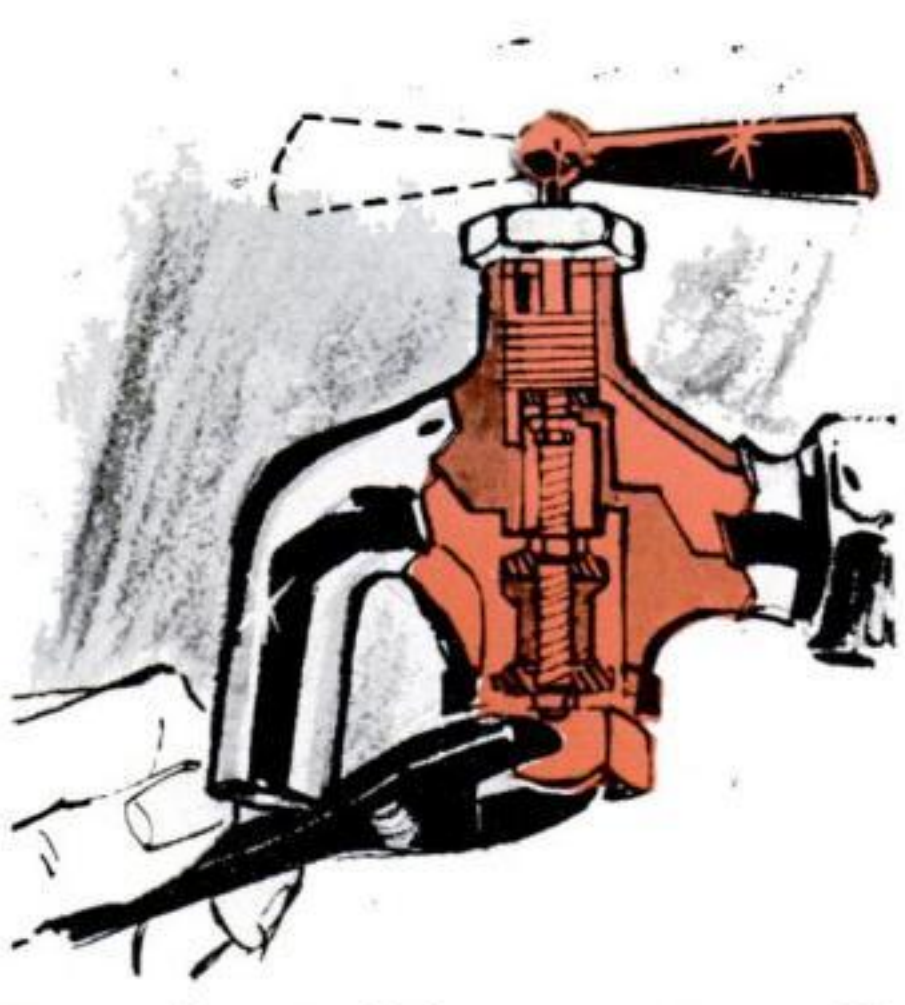
Urheberrechtlich geschütztes Material



# New Ideas from the Inventors

**Hoist rides ladder rails.** Workmen could move building materials up and down more easily with this recently patented hoist fitted to a ladder. Tracked to ride the ladder rails, the platform would be hauled up by a line connected to a pulley on the top rung and to a winch assembly on a lower rung. Remote switches would control the reversible motor.

**Matches light or write.** You'd be less likely to be at a loss for a pencil—at least if you're a smoker—if book-match tips were coated with a thin layer of graphite. These coated matches would serve in an emergency for keeping score or making notes, and would light in the usual way when you rubbed them against a safety-match friction strip.

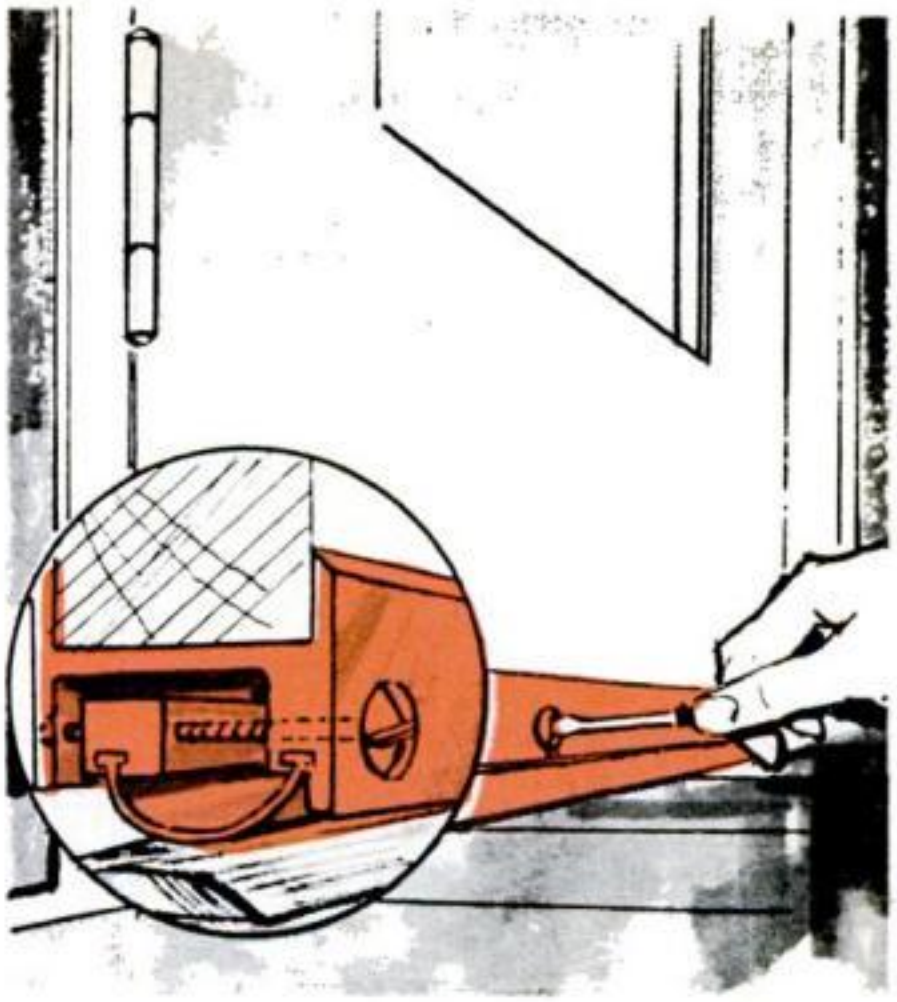


**Faucet shuts itself for repair.** You could repair this faucet, or replace a disk or washer, without shutting off the water at a main valve. Water would normally flow around and through two separate seats; either could be closed—by a reverse or partial turn of the spigot—to allow the other to be repaired from top or bottom.



Urheberrechtlich geschütztes Material

**Odometers divide car mileage.** Separate odometers linked to separate ignition switches would permit a number of drivers to share a car and apportion the maintenance costs according to use. Attached to any car, the system could also keep separate records to show how much mileage was for business and how much was personal.



**Adjustable door seal stops drafts.** Clipped to the bottom of any new or old door, this flexible weatherstrip would adjust for as loose or tight a seal as you, the weather, or a sagging door might require. One end of the strip would be fixed to the flanged channel, the other to a bar that could be screw-adjusted to change the base curve.

**Optical guide steers car.** This automatic steering system would optically scan a road stripe, curb, or divider, and steer a car to maintain a set distance from the guide. You'd "unload" the tape memory by steering manually, "reload" it by focusing a mirror-mounted scanner on a new guide. A proximity alarm would signal obstacles.

*The following patents have been issued on these inventions:* **Ladder hoist**—*No. 3,115,211 to J. A. Ostrander Jr., Jamestown, N.Y.;* **Writing match**—*No. 3,175,685 to N. J. Waterbury, NYC;* **Dual-seat faucet**—*No. 3,075,541 to W. F. Hajek, Chicago;* **Multiple odometers**—*No. 3,179,336 to R. H. Peckworth, Charlotte, N.C.;* **Door seal**—*No. 3,114,946 to Ronald O. Fluck, Perkasie, Pa.;* **Steering guide**—*No. 3,172,496 to Jacob Rabinow, Takoma Park, and William Fischer, Silver Spring, Md.*

*Copies of patents may be ordered, by number, from the Commissioner of Patents, Washington, D. C. 20231, at 25 cents each. To write to an inventor, if the address above is insufficient, address him (by name and patent number) in care of the Commissioner of Patents.*



Urheberrechtlich geschütztes Material

# Build

Urheberrechtlich geschütztes Material

# a Gas-Powered Mulcher

It munches up all your garden rubbish and turns out compost—a natural soil builder

**By E. F. Lindsley**

DOES your yard put out leaves, grass cuttings, hedge clippings, and other plant debris that's hard to get rid of? Here's a way to turn the stuff into a blessing: Convert it into organic fertilizer with a garden mulcher. Don't let the price tag of $100 or so on a new mulcher stop you. For about $25 you can build this one. It will gobble up all sorts of organic matter, including kitchen peelings, and spew out finely chopped mulch.

Of course you can make compost by just piling up the rubbish and letting it rot. But this might take a year or more. Shred the stuff in a mulcher, however, and it will decompose in about three weeks. Just keep the chopped-up matter moist, not soaked, and turn the pile a few times.

I looked over some of the mulch choppers you can buy, then decided to build one myself and put a few special features in it. I wanted to be able to add or remove blades easily for fine chopping or coarse cutting. I wanted to be able to make it simple to clean out any strands of vines, strings, or whatnot that might get wrapped around the rotating parts. And I wanted the discharge chute at just the right height to dump the cuttings directly into a basket.

***Selecting an engine.*** In today's lush market for gas-powered equipment, there are plenty of good used one-lung engines around. Get one in the three- to six-hp. range. The engine I used is only 1½ hp., but since I don't use my mulcher for chopping up sticks, cornstalks, or other bulky material, it works fine.

Pick an engine with a horizontal crank-

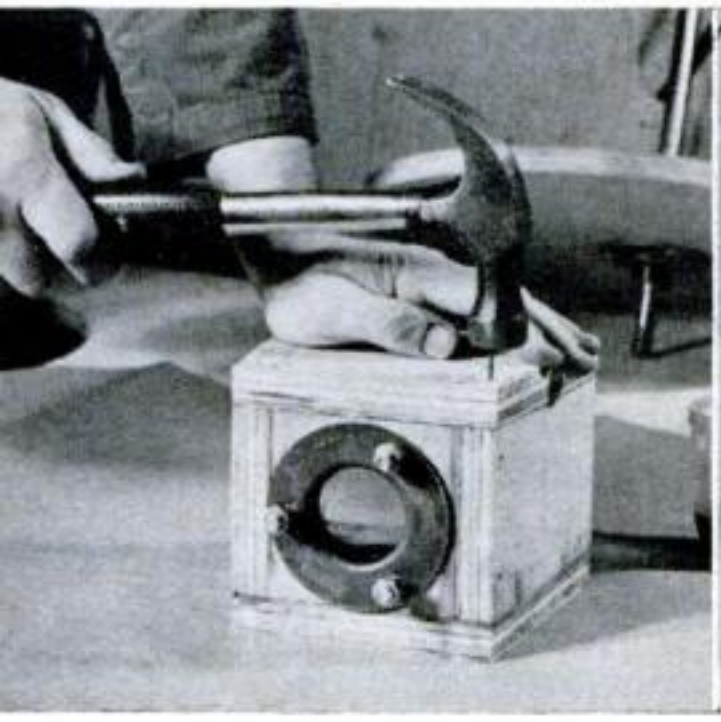
CONTINUED

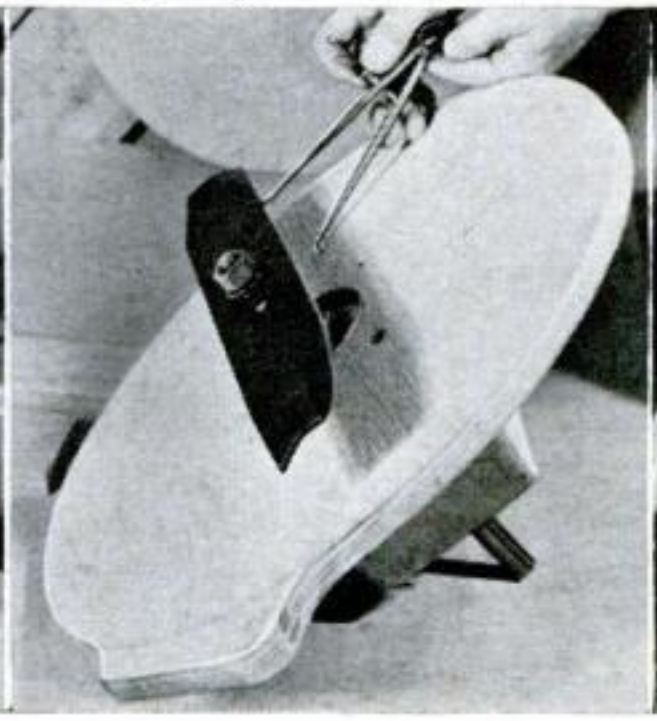
## Build the drive-shaft assembly and fit it to the engine

**Bearing support** is glued and nailed. The rear-bearing retaining bolts are put in with the nuts on the outside. This permits removing rear bearing for access to the front bearing.

**Position the bearing support** on the rear panel by temporarily mounting it with cutting blade and shaft. Adjust until the blade turns in a plane parallel with the rear panel, then assemble.

**Mount the rear panel** by temporarily clamping it to the engine support. Set engine in place and position the panel to get sufficient clearance between the crankshaft and drive shaft.

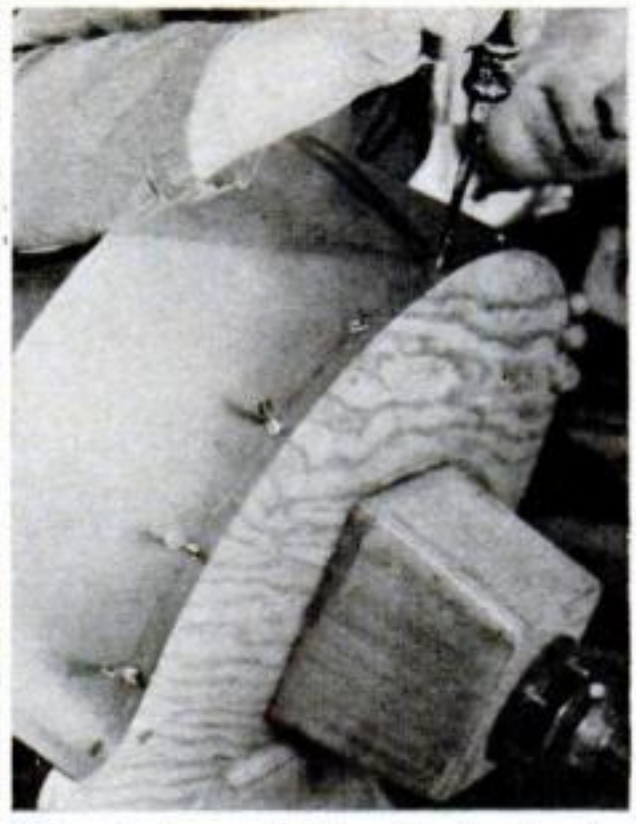




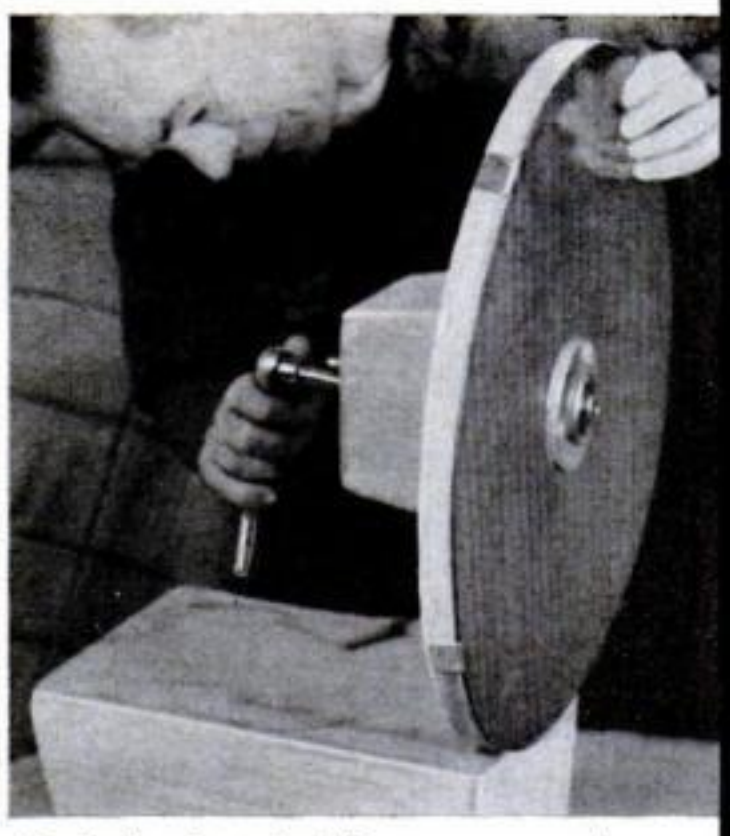
Urheberrechtlich geschütztes Material

## Make and assemble sheet-metal drum and panel liner

**Have drum rolled** at a sheet-metal shop to get basic cylindrical shape. Use strong-arm method for small bends. Screw drum to back panel to locate bends at bottom and lower end.



**Mount drum** flush with back of rear panel and drill screw holes. To get a stronger screw hold, drill only for the shank of the screw. Mount drum only temporarily to make screw holes.



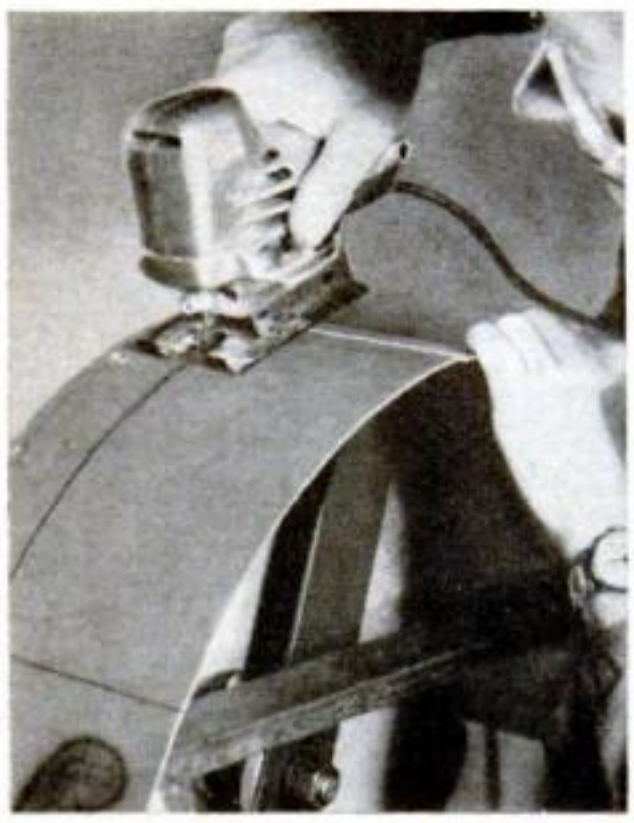
**Cut sheet metal** for rear panel with tabs to suit screw holes. Remove the front bearing and put the metal under it. When drum is replaced, punch through the sheet-metal tabs for screws.

shaft. It takes a lot of fussing with the carburetor and oil system to convert a rotary-mower engine with downward crankshaft for horizontal running.

You can mount the blades directly on the crankshaft, but a separate, belt-driven shaft for the blades is better. It will prevent engine damage in case the mulcher gets clogged or a stray rock is tossed in the hopper. Also, it makes it easy to change speed ratios for cutting various kinds of material. I mounted the blades between washers so they would slip on impact with a bulky object. But more important, I used a centrifugal-clutch pulley on the engine crankshaft. This drops the blades out

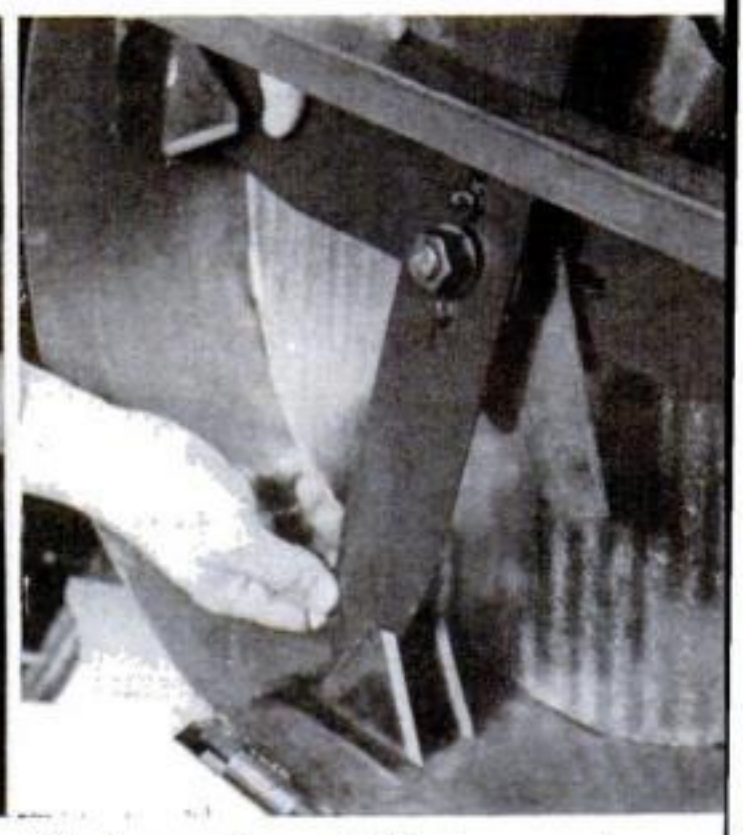
CONTINUED

## Cut chute opening and assemble the cutting blades



**Cut out** and bend up sides of chute opening after welding the breaker bar in place. Put the breaker bar ¾" in from the edge of the drum so that the front panel closes against it.

**Brackets** for the fixed blades are welded in place so that the front rotating blade passes between the breaker bar and the side blade, and between the two bottom fixed blades.

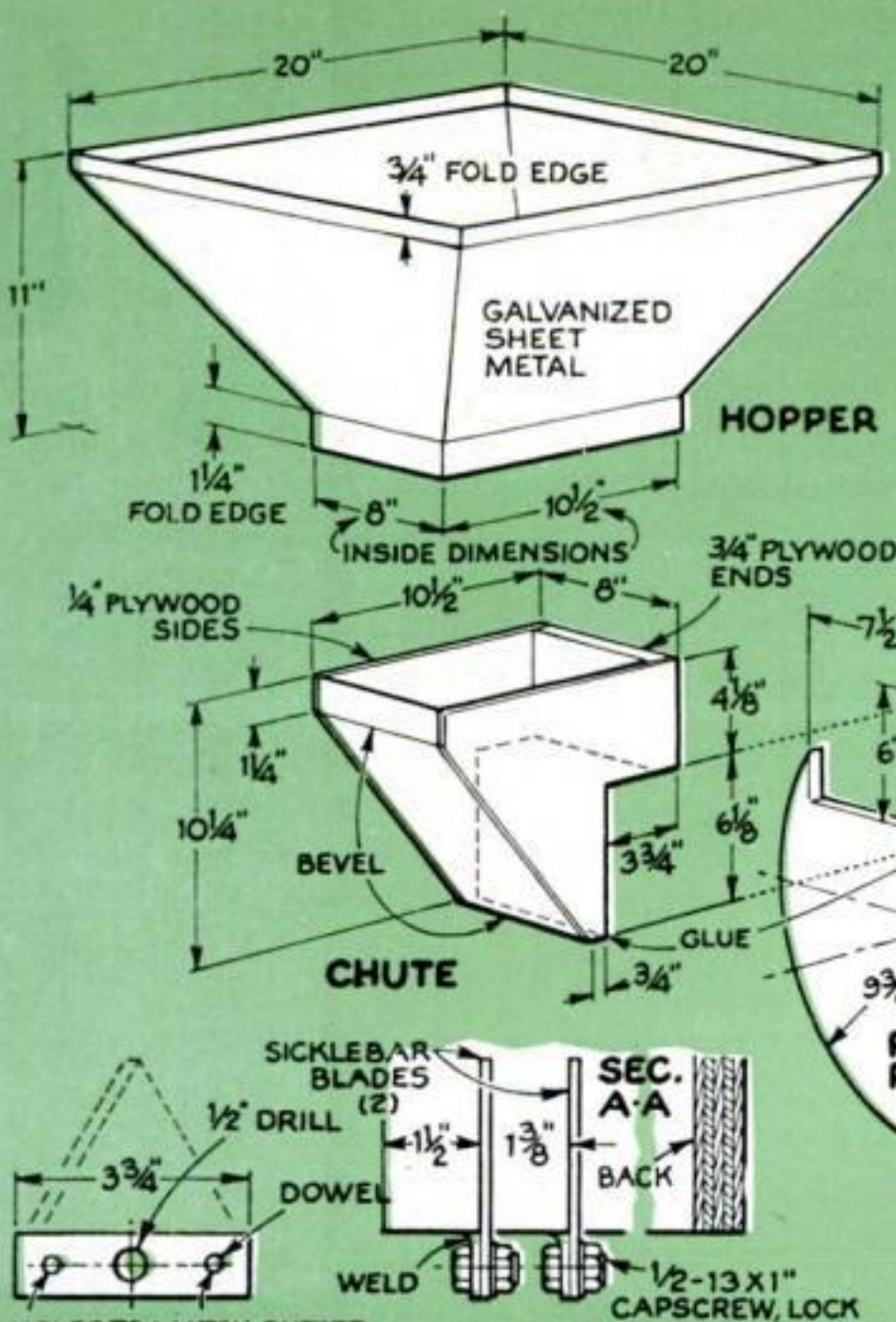


**Final spacing of blades** must bring the rotating edges close to fixed edges but with room for average-size material to pass without jamming. Use spacer washers to build up assembly.



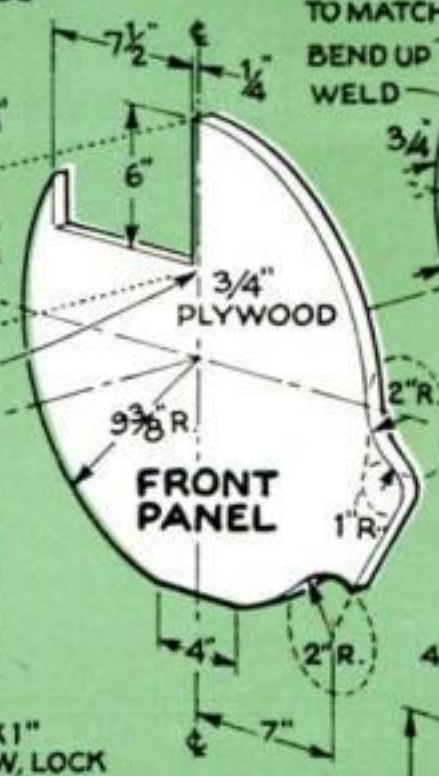
Urheberrechtlich geschütztes Material

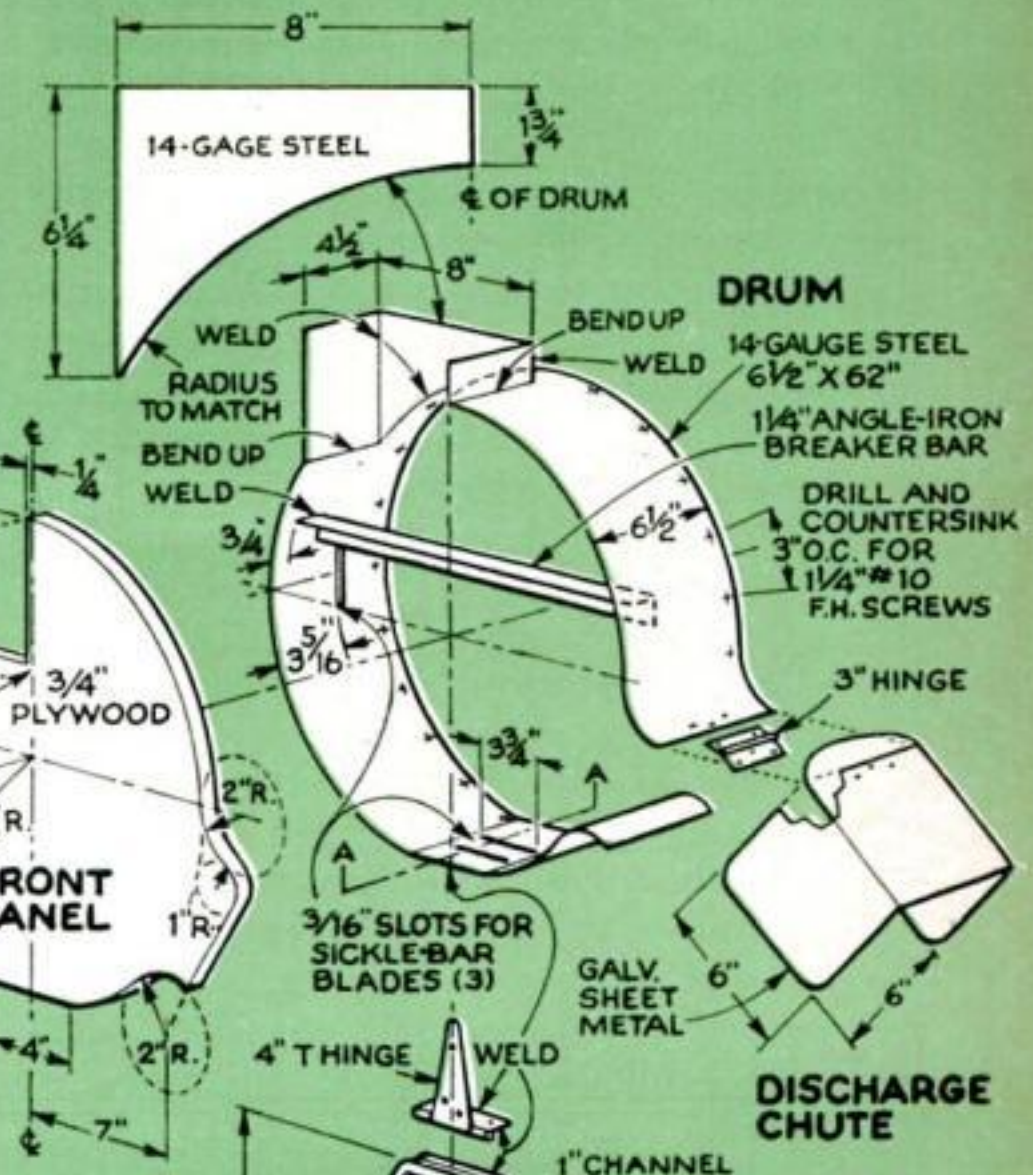
# Plywood, sheet metal, and odds and ends—here's how you put the mulcher together

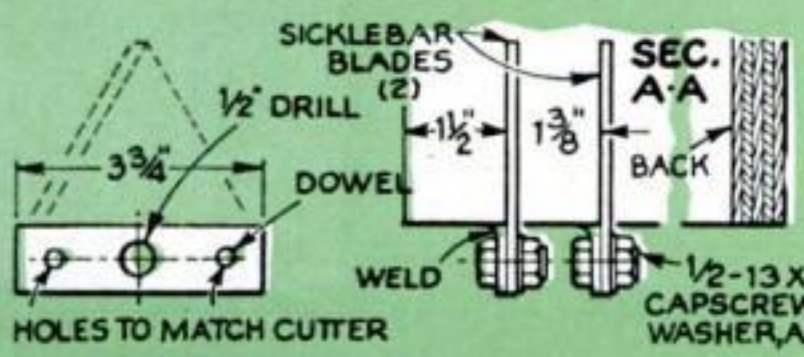


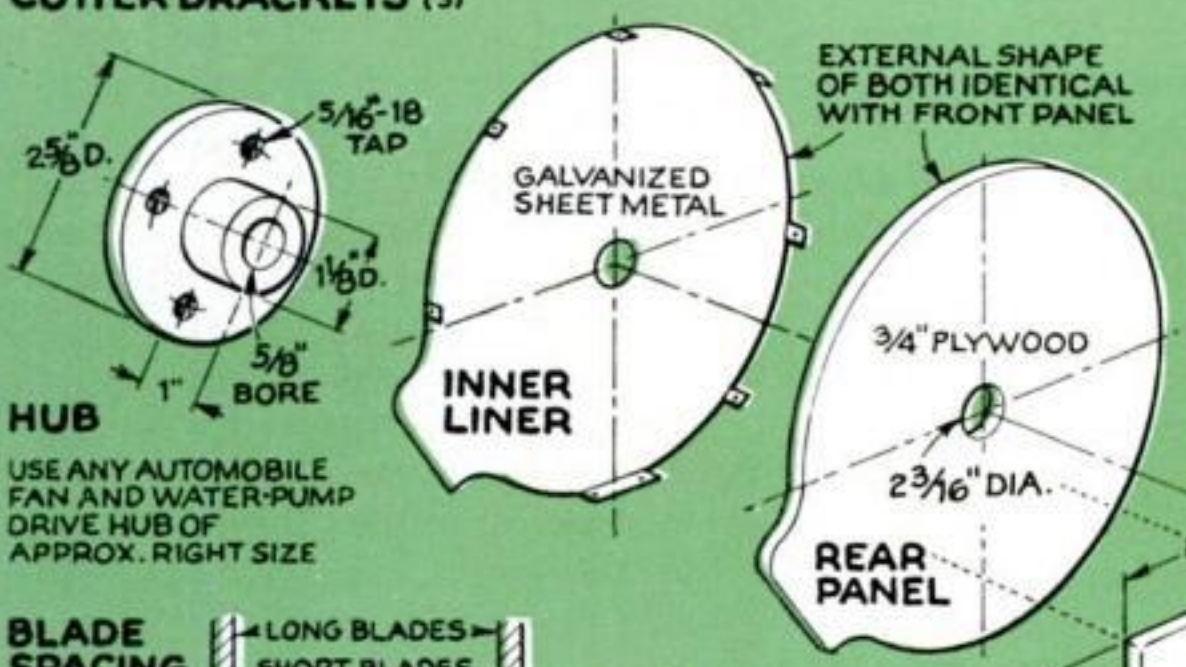


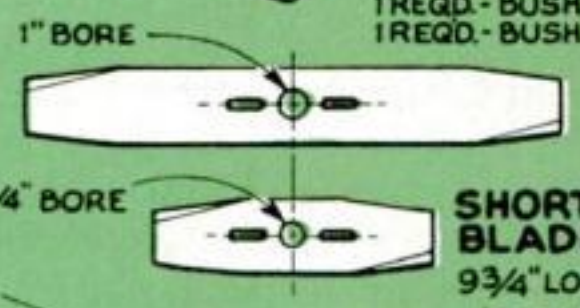


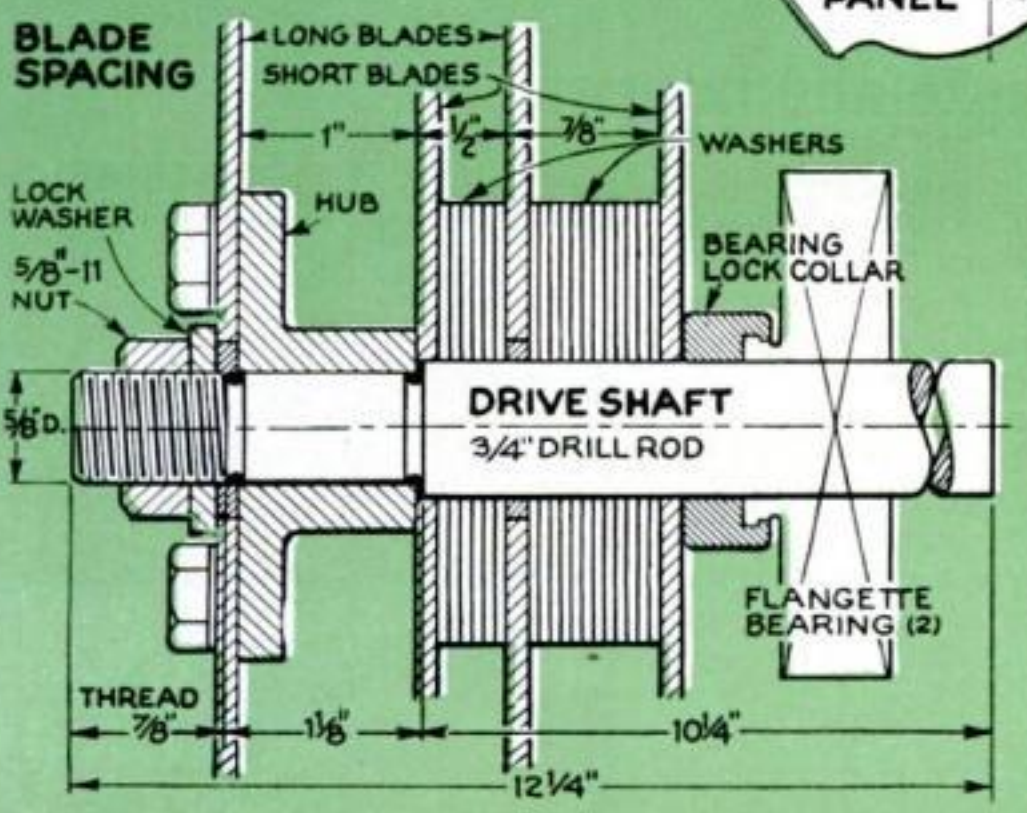


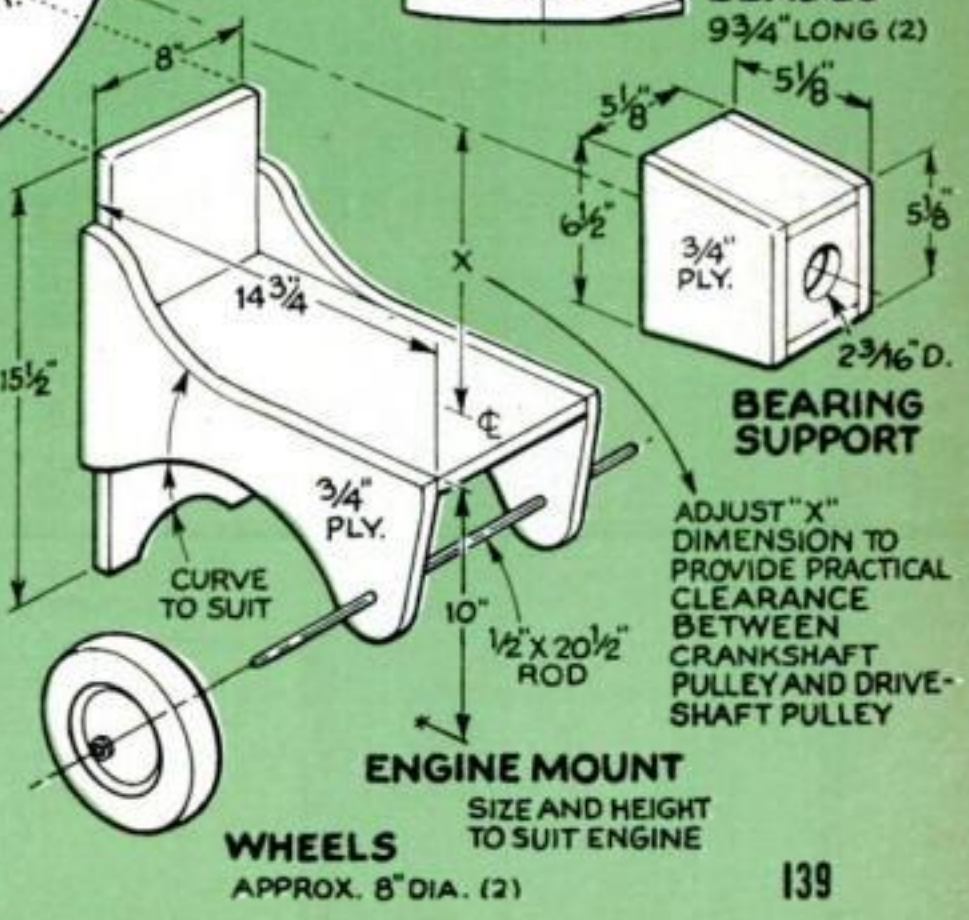





of rotation in case of bad clogging and permits the engine to warm up without load. I used a 2½" clutch pulley available from Salsbury Corp., 1161 E. Florence Ave., Los Angeles 1.

***Mounting the cutter assembly.*** Use the regular rotary-mower blades that are sold as service replacements. New ones in good balance are safer than used ones.

The short blades are not really necessary, except for the occasional times a few pieces sneak through the center and avoid the knives. The short blades catch these sneakers so everything comes through chopped in fairly even-sized bits in the range of ¼" to ½".

The triangular sickle-bar blades are common farm-store items, but you may find the bolt holes different from those shown. Most important, they should be firmly anchored so they won't get knocked loose and come flying out at you.

The two long blades are set at right angles to each other initially, but they move around some since they are retained by friction only. As near as I can see, this doesn't change its performance.

I turned the drive shaft out of ¾" drill rod, but a suitable substitute can probably be found as a ready-made power-mower part. An automobile water pump and fan-drive hub make a handy blade mount and can be picked up at any junkyard. For drive-shaft bearings, I used Fafnir Flangettes, type RAO12NPPB, for ¾" shaft. You can order these from Bearings, Inc., 4801 W. Center St., Milwaukee, but they are available at many mill-supply houses.

***Building the mulcher.*** I made my mulcher out of exterior-grade plywood because it's easy to work and makes a lightweight machine. But you can weld the whole thing out of sheet metal if you want to.

Obviously, you should select the engine before you start building. You may have to change the size of the engine mount. Also, you will have to mount the drum on the engine mount at a height that will give sufficient clearance between the crankshaft and drive-shaft pulleys.

Tack the front and rear panels together for cutting and edge sanding. It's important that they be identical. Don't cut out the chute opening in the front panel until the hopper opening is formed on the drum.

Be sure the edges of the steel strip for the drum are parallel. Screw the drum to the rear panel before cutting and welding the chute opening. Still, the drum may warp some from welding. If so, bend and bump it until the front panel closes.

Before the bearing support is mounted permanently on the rear panel, it should be assembled temporarily on the drive shaft. You can then determine the exact position for mounting it. The cutting-blade tip should rotate in a plane parallel with the rear panel.

You can determine the right position for mounting the rear drum panel by clamping the panel to the engine mount. Set the engine in place and adjust panel position to get adequate clearance between the crankshaft and drive-shaft pulleys. Drill holes for mounting bolts and assemble.

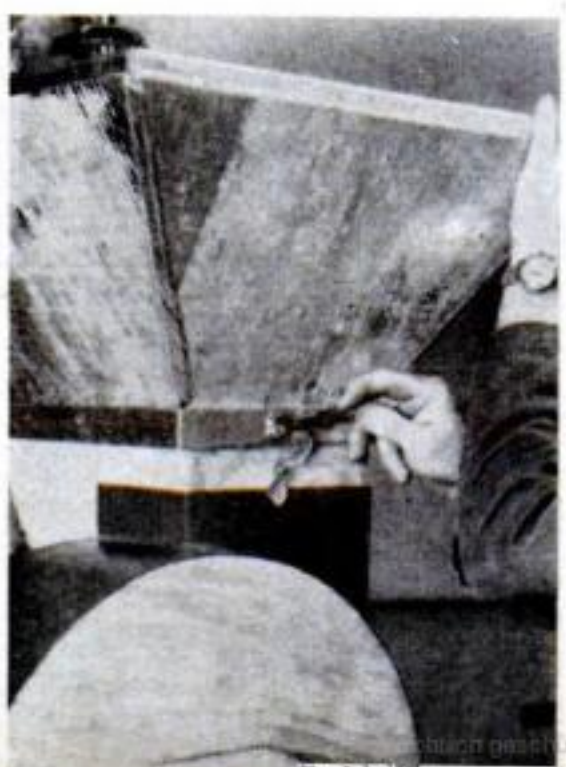
Bolt the front panel to the bottom hinge; then make a cutout in the front panel and glue and nail the chute in place, using the cutout in the drum as a guide.

***Operating the mulcher.*** Don't run the mulcher if it vibrates or rattles. Never run it with the front cover open. When dumping material into the hopper, don't stand in line with either the feed or discharge openings. Above all, never use your hands to feed the material into the chopper. Use only a small stick of a size that will be ground up by the knifer. ■ ■

## Fit front panel and mount chute and hopper

Make cutout in front panel, and glue and nail chute in place after mounting panel on the bottom hinge. Use drum cutout (left) as a guide. Parts should fit snug but permit easy opening.

Hopper can be made up in a sheet-metal shop if you don't want to do it yourself. Attach it with coarse-thread screws (right). Screen latch on chute locks front panel in place.



Urheberrechtlich geschütztes Material

# SHOP TALK

**By Robert P. Stevenson**

### You mix and mold a new epoxy adhesive in your hands

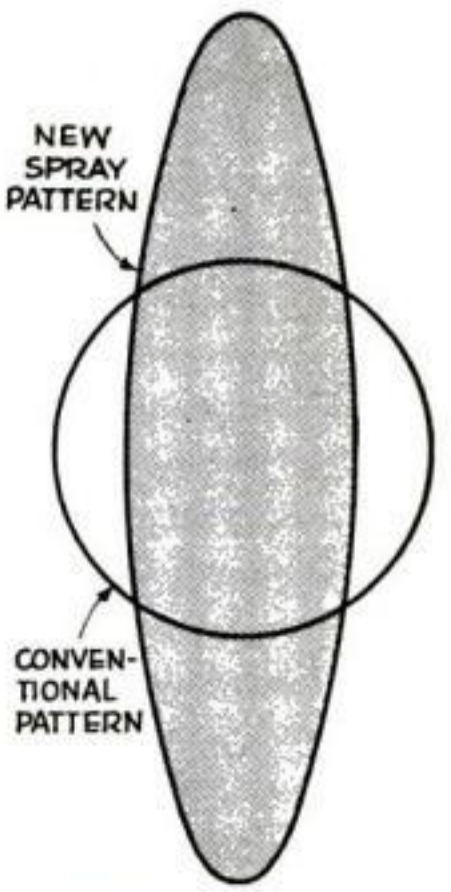
The stuff you buy is about the size and shape of two quarter-pound bars of butter. One is labeled "hardener," one "resin." Slice off equal portions of each, mix them together in your hands like putty, and you've got an epoxy adhesive that will mend just about anything. But *caution:* Wash your hands thoroughly at once or the resin may irritate your skin. The maker: Atlas Mineral Products Div., Electric Storage Battery Co., Mertztown, Pa.

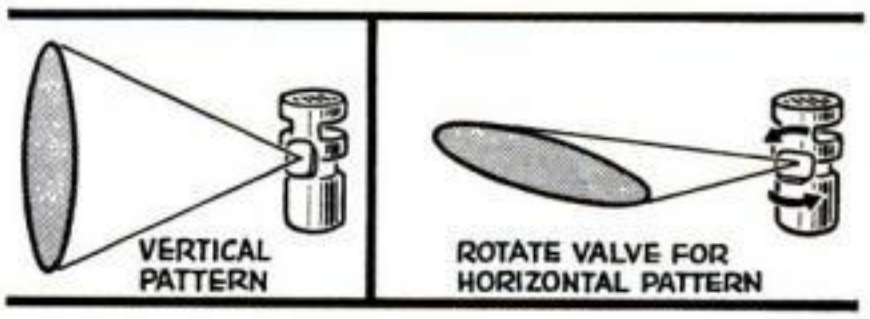
### Speak Russian? Maybe Uncle Sam needs you

If you have a good knowledge of hand tools, are at least 21, and speak Russian, perhaps you could wangle a trip to Russia. The U.S. Information Agency, Washington, D.C., is looking for men with those qualifications. They will serve as guides for an exhibit of American hand tools that will soon be shown in the Soviet Union.

### Three new items to look for in the paint shops

Pressurized cans have been a handy way to buy paint in small quantities for quite a while. Now, one line comes with a new head that throws paint in a fan-shaped spray instead of the usual conical pattern (sketch at right). Sprayon Products, Inc., Bedford Heights, Ohio, claims that the new pattern delivers a more uniform coating on the work surface. To fit different situations, the pattern can be changed from vertical to horizontal, as you may wish, by rotating the valve tip (sketches below). . . . Those of you who like to keep your auto engine looking factory-new should investigate a new silicone paint designed to withstand temperatures up to 1,200 degrees. It can be sprayed on anything that gets too hot for ordinary paint—cylinder heads, exhaust manifolds, pipes and mufflers, ovens, kilns, and other hot surfaces. U.S. Paint Corp., 250 Fulton Ave., Hempstead, N.Y., makes Hot Paint in spray cans in red, orange, yellow, blue, silver, white, and black. . . . Like to change the color of your car upholstery? You can—with new brush-on Color-Hit, a coating for leather, vinyl, and plastics, marketed by Color-Hit, 3317 E. 50th St., Los Angeles. But suppose you want to switch colors again? You can. Just use a remover-cleaner from the same company. Then apply the new color.



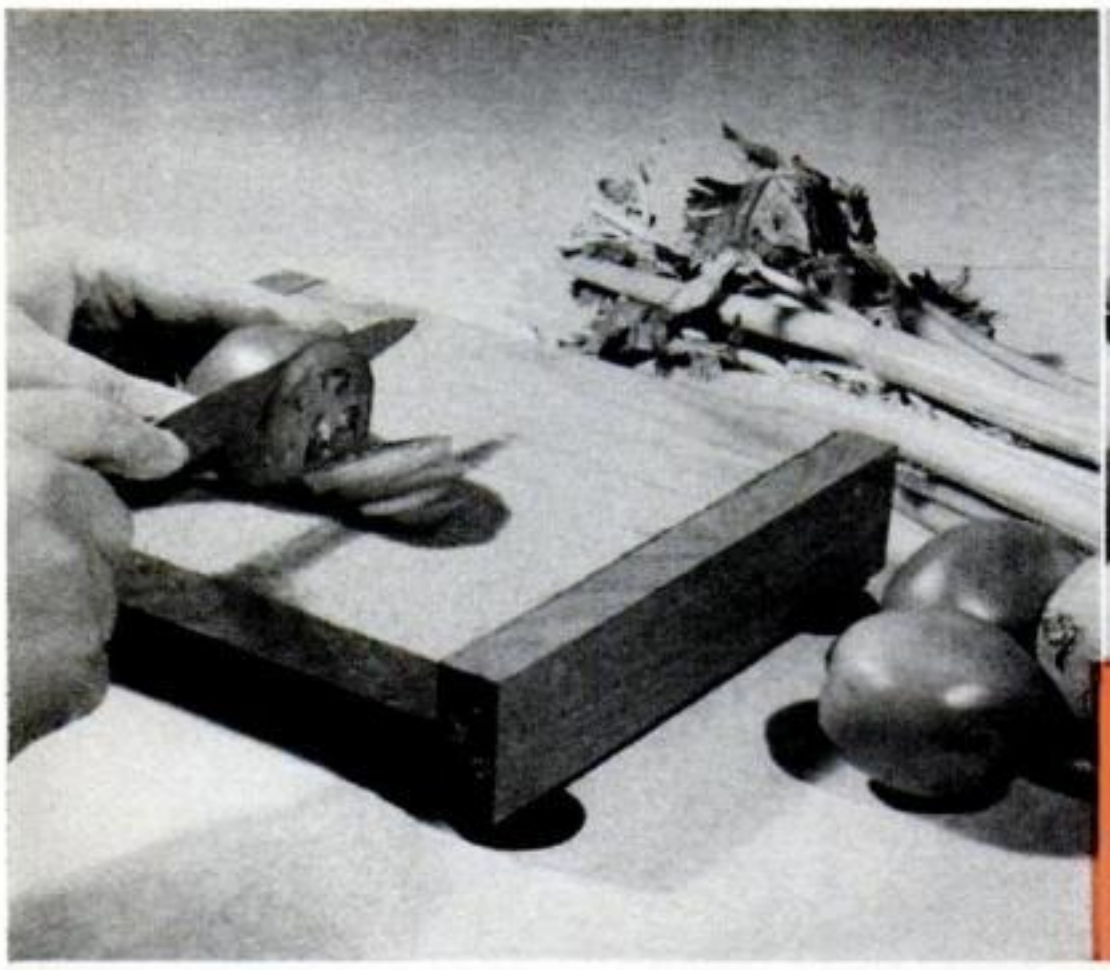



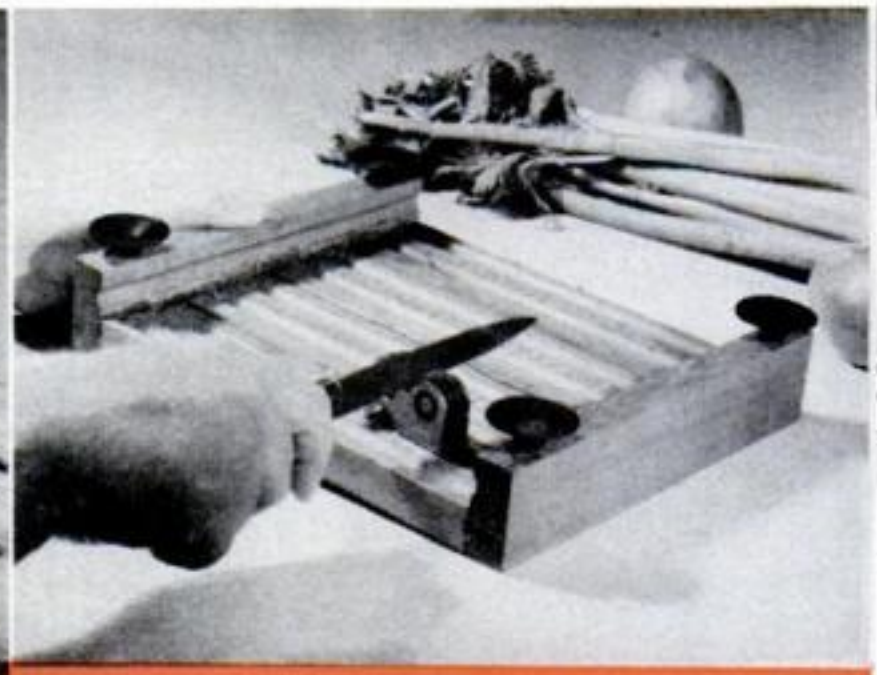



Urheberrechtlich geschütztes Material

PS PROJECTS

# Three Woodworking





**Built-in knife sharpener** fastened to the underside of the cutting board is handy when you want it. Suction cups keep the board from slipping on even the slickest counter surface.

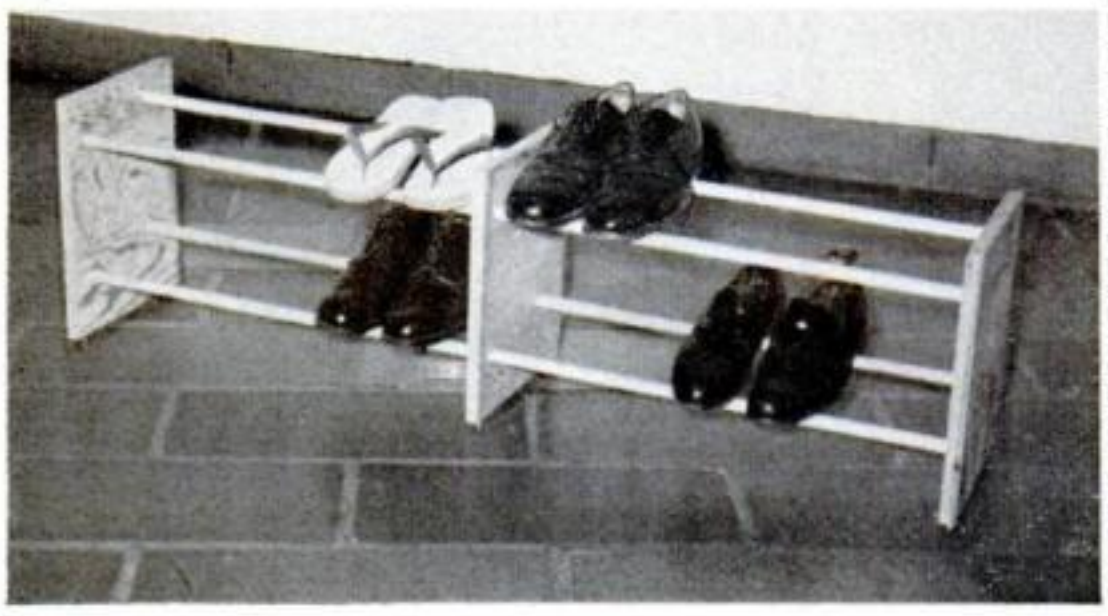
## Nonskid Cutting Board Has Own Sharpener

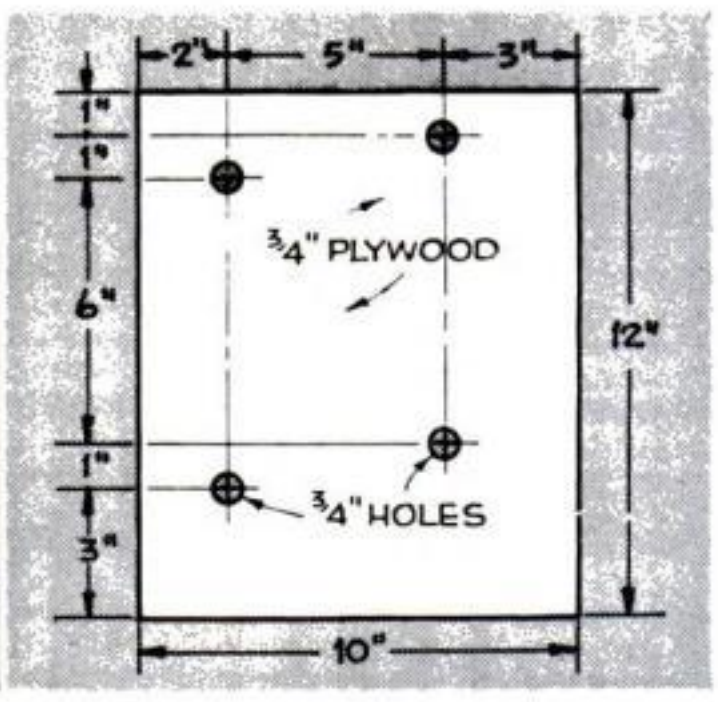
Scraps of hardwood flooring, often to be had for the asking at building sites, make a handsome, serviceable board for cutting meats or chopping vegetables.

Cut and square four pieces to identical length. Plane or saw off the tongue of one piece and the grooved edge of another. Apply water-resistant glue to the other edges and clamp up the four pieces as shown (above, right). Put a piece of paper, preferably wax paper, on each side to keep pieces from sticking to the clamp boards.

Trim both tongues and grooves off the two crosspieces (the feet). Holding them

## Keep closet floors neat with this quickly made shoe rack



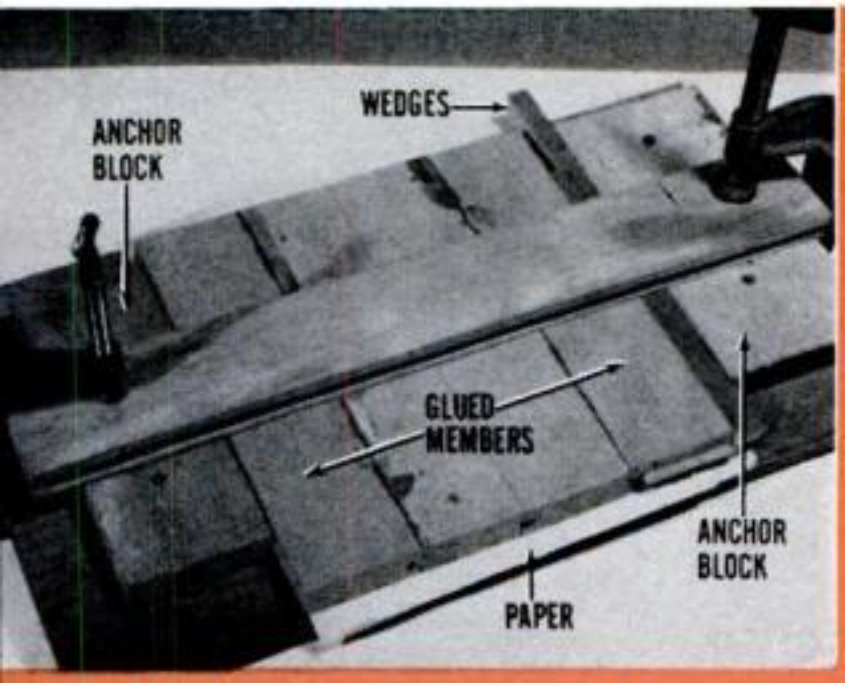


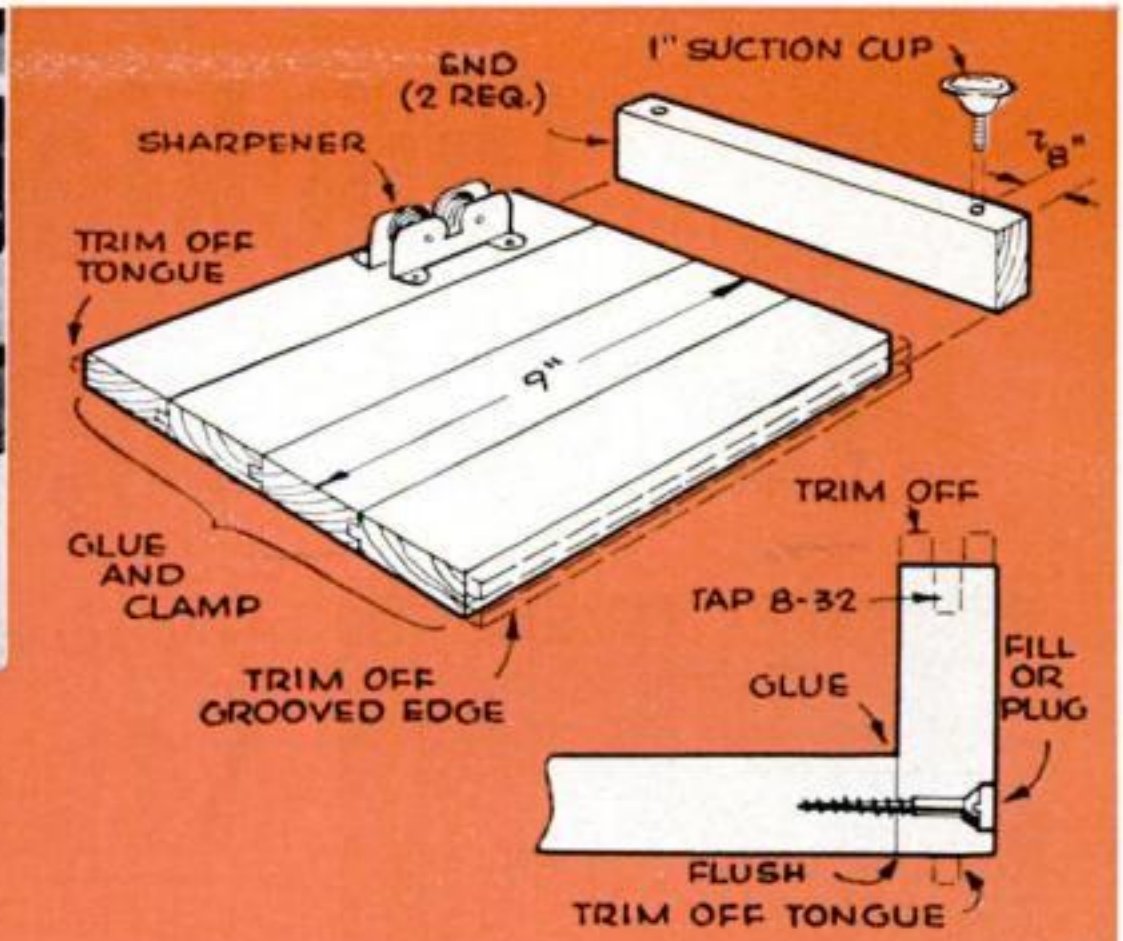

I ended shoe-cluttered closet floors in our house with a simple rack that I made in about an hour. I used four ¾" dowels 4' long and three pieces of ¾" plywood cut and drilled as shown in the drawing. To line up the holes, I clamped the pieces together for drilling. The dowels were glued in place. I put furniture glides on the bottom edges of the plywood so the rack would slide easier.—*W. P. Brothers, Woodside, Calif.*



Urheberrechtlich geschütztes Material

# Projects for the Weekend



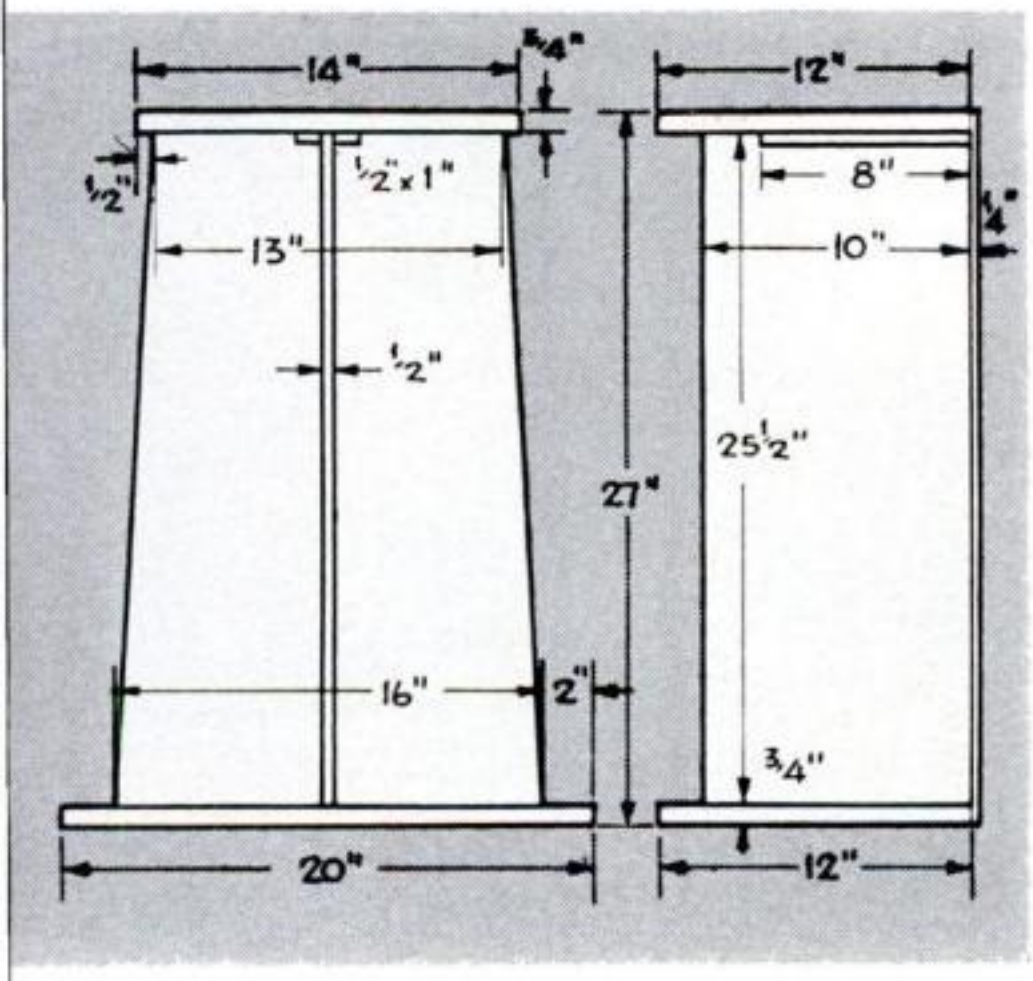

**Use this clamping arrangement** to glue up the pieces of flooring. Use waterproof glue and wedge the joints tight between blocks screwed to a board. Top clamping prevents buckling.

against the ends of the glued-up section, and flush with its top. drill and counterbore for 1½" wood screws. Assemble with glue all along the joint.

When the glue has set, sand or scrape off any glue or paper that sticks to the top, leaving a smooth, flat cutting surface. Tap the feet for a 1½" suction cup inside each corner as shown. If you haven't an 8-32 tap, make starting holes with a No. 29 or 30 drill. Then hammer an oiled 8-32 steel bolt in slightly, and screw it ½" in to cut threads in the wood. Remove bolt, and screw in suction cups to an even depth.

Finish the board all over by swabbing on several coats of hot vegetable cooking oil. Mount a knife sharpener under the board.—*Harry Walton, White Plains, N.Y.*

## A sturdy, easy-to-build typewriter stand with lots of leg room



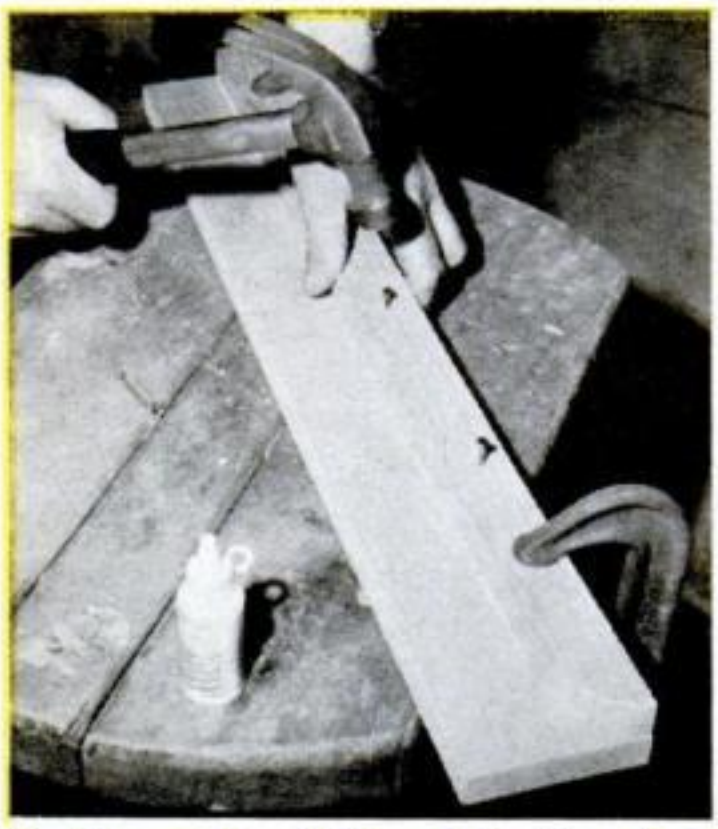
This plywood stand for a portable typewriter can be put together in an afternoon or evening. It's lighter than a typewriter table, yet quite sturdy. Sit at the stand with knees astraddle the center upright and you'll have plenty of leg room. Use ¾" plywood for the top and base, ½" plywood for the back and center support. Assemble with finishing nails and glue. Avoid driving nails through the top where they will show by gluing a strip of scrap plywood on each side of the center support.—*J. W. Clement, Healdsburg, Calif.*



Urheberrechtlich geschütztes Material

**I found it easy to make straight, accurate saw cuts by first putting together this—**

# Quickie Saw Guide for Cutting Big Panels



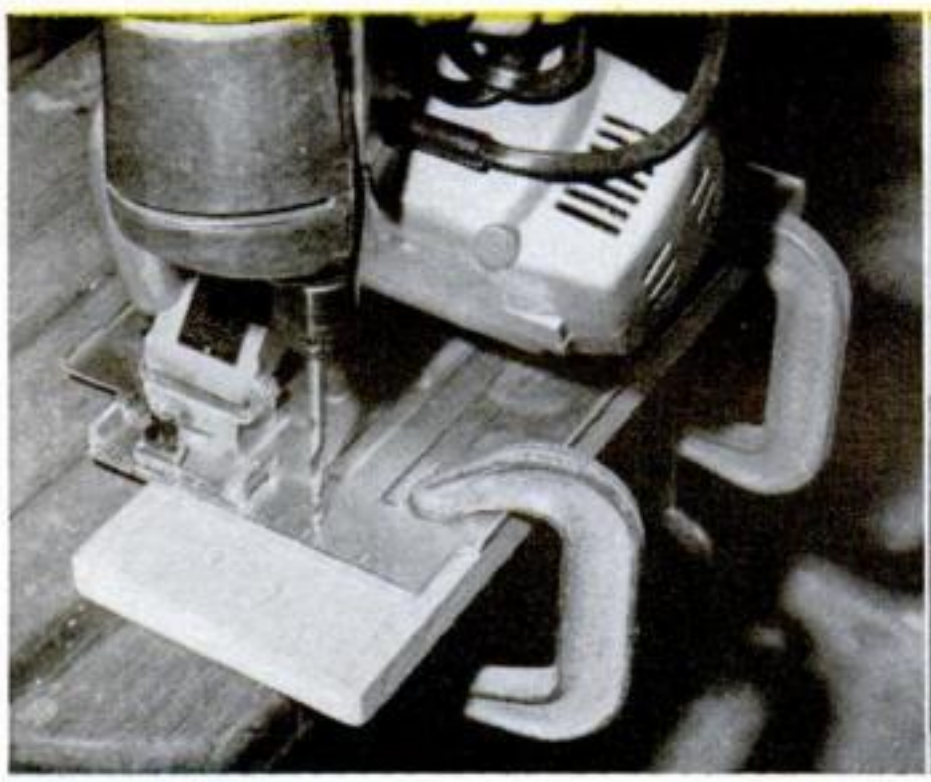
**1 Glue and nail the rail to the edge guide.** Use ring nails or screws. Sand the rounded leading corner of the guide rail to prevent snagging.

**By Victor Kondra**

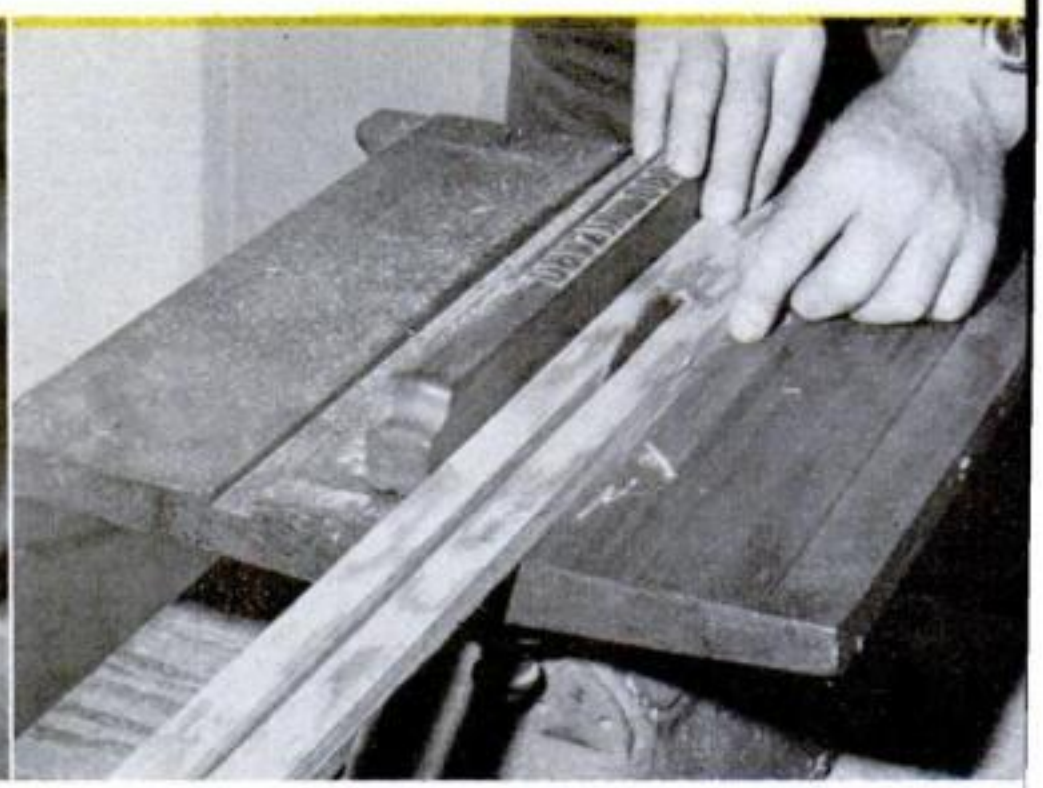
MANY home-improvement jobs require large panels—plywood, hardboard, particle board, plasterboard. Cutting a straight line on one of these panels can be frustrating. That's why I built a guide for use with a portable circular saw. Mine was made from scrap in less than an hour. It will cut strips from 2½″ to 32″ wide.

I call it a ripping guide, but actually it can be used for crosscutting, too. You can even use it to cut a straight line from an uneven edge.

When cutting a large panel, mark off the width you want. Adjust the saw on the guides so the blade lines up with the mark, and move the panel, on table or sawhorses, so the blade will clear as it cuts through. Then rip away. Walk alongside with one hand on the edge guide, holding it snug to the stock while the other hand operates the saw trigger. You make crosscuts the same way.



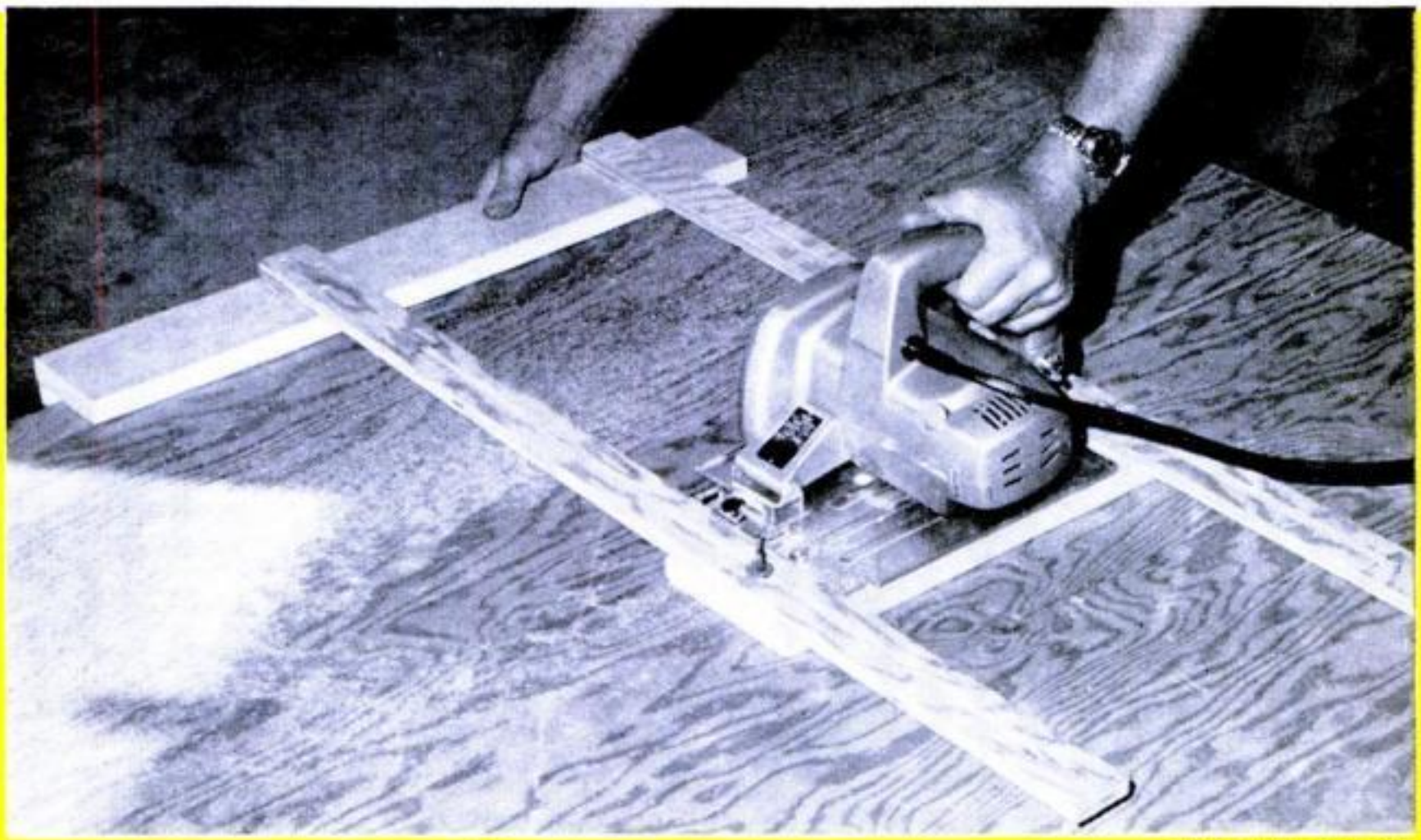
**2 Drill a ¼″ hole** at each end of the saw base. Clamp both saw base and saw together so the holes match. It's easier to set up the guide if you glue the bolt heads in place.

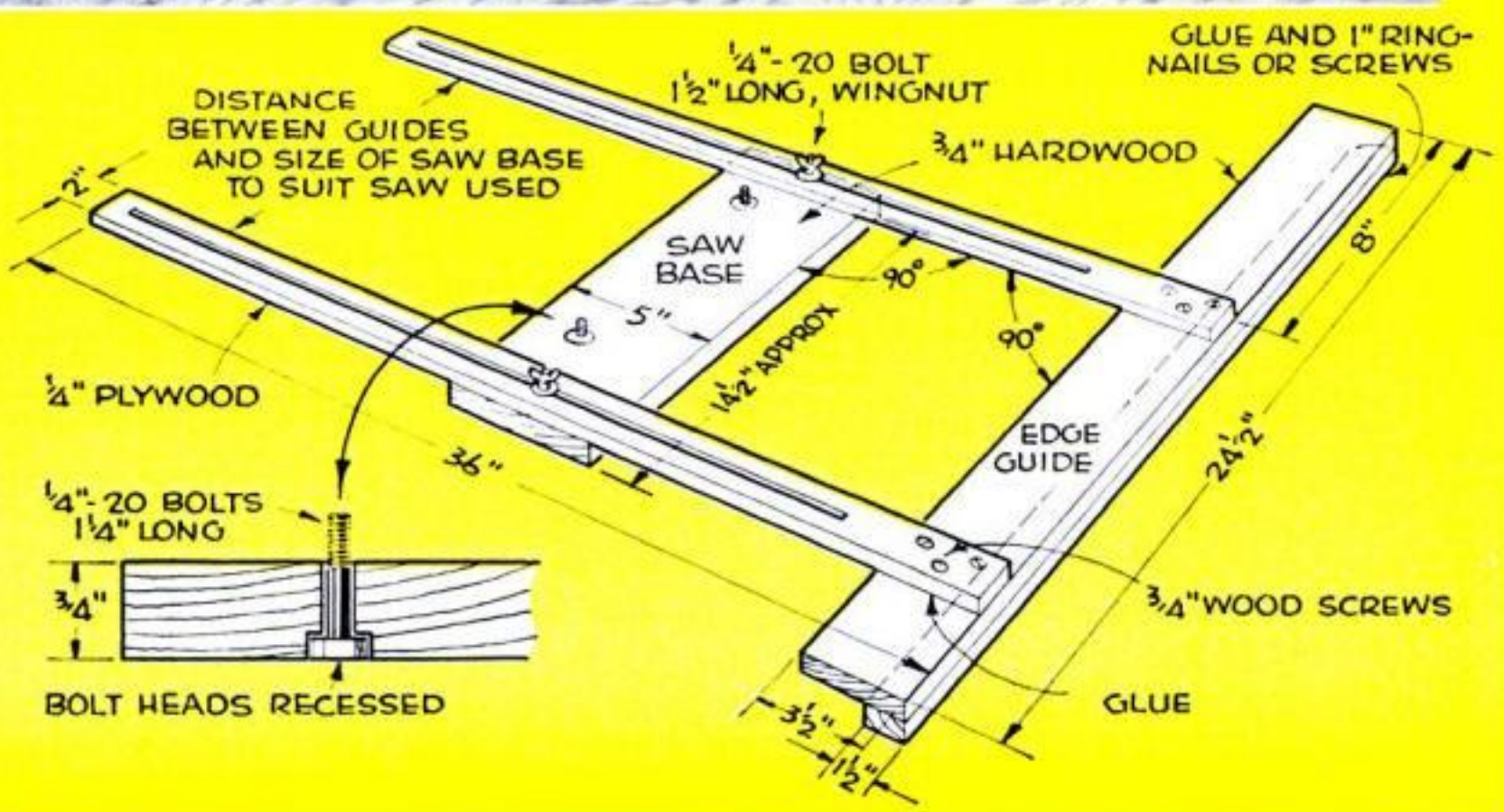


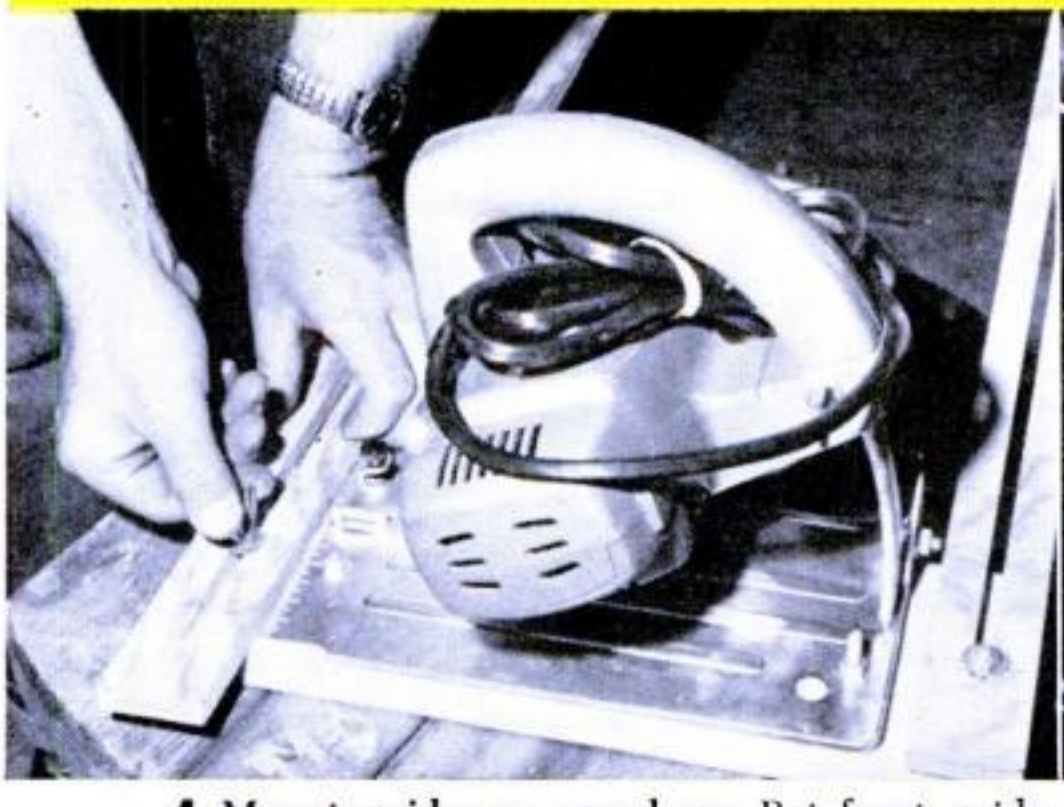
**3 Make the guide slots** by drilling ¼″ holes at the ends of the slots. Set rip fence to cut one side. Start cut by pushing stock down onto blade. Flip the stock over to cut the other side.

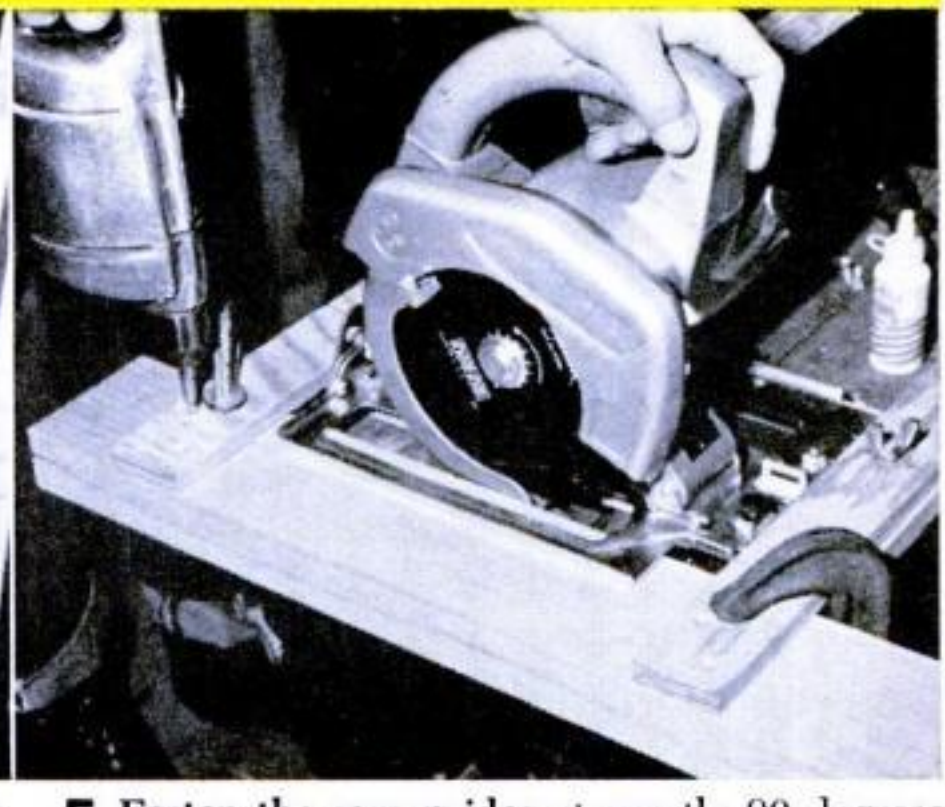


Urheberrechtlich geschütztes Material







**4** **Mount guides on saw base.** Put front guide flush with leading edge of the saw base, since this is square with the blade. Attach rear guide, allowing clearance for safety guard.

**5** **Fasten the saw guides** at exactly 90 degrees to the edge guides. Glue and screw while the saw and base are mounted in place. This will keep the saw blade parallel to the edge guide.



Urheberrechtlich geschütztes Material

# How to Make Any Glue Work Better

By Bob Gilmore

*TODAY's glues are so easy to use they can tempt us into careless workmanship. No matter which adhesive you choose, there are cardinal rules you can't ignore. If, now and then, one of your glue jobs falls apart, maybe it's time for you to check over the basic rules once more. Here they are, ready for quick review*

## 1 Keep it clean

The glue itself must be uncontaminated and the surfaces to be glued must be clean. Dust, moisture, wax, oils, solvents, paints, oil stains, old glue—even unseen perspiration or skin oil from your fingers—may act as parting agents to prevent a tight bond. Also, green or highly resinous wood won't let glue get a good grip.

## 2 Watch the temperature

Never apply any glue when either the glue or the surfaces to be glued is colder or hotter than the label advises. If you can't control the temperature, put off the job until the thermometer moves within the glue's working range, or move the job to a place where you *can* keep the temperature within the proper range.

## 3 Prepare the job properly

Lay out everything you'll need for applying the glue and holding the work together, especially if it's a quick-setting glue.

Be certain that surfaces mate perfectly, with no high spots and dips to produce a glue line alternately starved and glutted—nowhere as strong as it should be.

Such joints as laps, dovetails, dadoes, splines, mortise-and-tenons, and scarfs are strong only when fitted accurately enough for an even and tight glue line.

Metals and other nonporous materials must first be etched or abraded to give "tooth." Some of the new molecular-attraction adhesives (epoxy is one), great for highly polished glass, are greater still with some roughness to cling to. (Roughen glass with silicon-carbide paper or stone.)

## 4 Mix accurately

Glues that don't come ready to spread will do their best only when you measure them out as precisely as the label directs. When you're told to measure level, *measure*



Urheberrechtlich geschütztes Material

*level.* Do it by scraping across the top of the spoon or other measurer, *not* by pressing flat the loose-mounded powder. Be especially careful with the proportioning of such catalytic adhesives as epoxies or phenol-formaldehyde marine glues. Too little hardener may give you a mass that will never set. Too much may make the glue brittle.

## 5 Mix correctly

If a label warns you to *add glue powder to water,* do it that way—or you may get insoluble lumps. Some glues also demand a rest after the first stirring so they'll be smooth.

Never stir glue so violently that it becomes filled with bubbles. Even though such entrapped air may be squeezed out by clamping, it can fool you into laying down too scant a coating.

Glues such as epoxy resins and their catalysts, of heavy, mastic-like consistency, can't be stir-mixed with much success. Instead, they should be kneaded with a putty knife or similar blade. Some catalyst-resin combinations come in contrasting colors that warn of insufficient blending by showing streaks or swirls. Others have parts nearly alike in clear color and should be patiently intermixed until you are sure they are free of uncombined streaks.

## 6 Spread with care

The plastic squeeze bottle is hard to beat for laying on glue. But this very convenience has been responsible for many a weak glue line, simply because too many users think it's sufficient just to lay down a long bead or two of glue and then slap the joint together. With luck, clamping pressure *may* spread the beads until they cover all meeting surfaces of the joint. But, if the bead spreads only a little, leaving much of the joint unfilled with glue, you'll end up with a joint that is weak.

Any glue should be spread evenly over the entire joint surface with a flat stick or some other tool. Do this swiftly when you coat large areas so that surface skinning won't prevent the glue from wetting the other surface it has to meet. This danger is greatest in warm weather.

On any highly porous material, like the end grain of wood, put on a precoating of glue, let it dry a little, then spread a second coat. Such precoating keeps the glue from being absorbed.

## 7 Clamp correctly

Some glues demand a tight squeeze. Others need only moderate pressure. A few get along without any.

For a heavy squeeze, use softwood pads between the clamp jaws and the work, and tighten until the jaws bite into the pads. For moderate pressure, tighten only until your hand feels firm resistance against turning. Don't assume that all glues are strong if you squeeze them tightly; some need a fairly thick glue line for maximum strength.

## 8 Give it time

Many a glue job that might have been a complete success is spoiled by impatience—by removing clamps too soon, or tugging or tapping to test unclamped pieces, or by premature application of loads.

Read carefully what the label says about clamping time, and remember the influence of heat and cold. If the air temperature is low, add enough clamping time to be sure, or apply gentle heat.

## 9 Suit the glue to the job

Probably the most frequent cause of glue failure is choice of the wrong glue. We are lucky, these days, to have many excellent general-use adhesives plus several that are highly specialized. There is never any need to make any glue do a job it isn't meant to do.

The experts say, "Ask a little less of the glue than you think it should deliver, then give it a little more help than you think it should need."



Urheberrechtlich geschütztes Material

# Now's the Time to

**By John M. Haller**

WITH winter coming on, this is a good time to check the trees on your lawn for splits. Crotches may divide during the summer because the weight increase brought about by the tree's increase in height and spread can outrun the strength of the wood.

A tree may split suddenly or gradually, opening up little by little. Sometimes a split that develops during the summer will partly close in autumn after the falling foliage has reduced the weight on the branches. But the split may then give way again during a winter snow or ice storm, or in the high winds of spring.

The time lapse between the appearance of a split and the loss of the tree varies widely. How can you detect a split crotch in time? By inspection, obviously. Use a ladder to check crotches too high to be seen from the ground or obscured by foliage. Sometimes the tree furnishes a clue by exuding sap, which runs down the trunk.

Once you find a split, what can you do about it? If the tree is small, you may be able to repair it yourself. If large, call in professional help.

As a first-aid measure, tie the two halves together with a rope placed high up among the major branches. Then, use a block and tackle or portable winch to draw two separated halves together. If you do it in time, the separated pieces will fit together. After several months, the wood tissues may become so warped that they won't mate perfectly.

***The right way***

Once the halves are drawn together, fasten them permanently with bolts or threaded rods passed through the trunk just under the split crotch or, where possible, in the limbs above it. Use two rods, aligned horizontally, not vertically. If you place the rods one above the other, they can break with the twisting action of the wind. Set horizontally, they keep the trunk from twisting. If you use bolts, drill holes for them and cut a small pocket into the bark to countersink head and nut. If you use threaded rods, drill the holes slightly smaller than the rod diameter. Screw the rod in until its tip just shows on the opposite side and cut off the projecting end with a bolt cutter or hacksaw. Apply tree dressing to all broken bark surfaces and around the edges of the split. If the split remains partly open at the top, seal it with a preparation of asphalt and sand.

On large, heavy trees two additional rods are sometimes placed a little below the first two. Besides this, one or more cables are

**Provide extra support** for large, heavy trees that have split by installing cables between the upper branches. Do not wrap the cables around the limbs; anchor them with U bolts as shown.



Urheberrechtlich geschütztes Material

# Save Your Split Trees

**Save a split tree** by bracing it promptly with long bolts or threaded rods. First, close the crack by winching the two halves together. Drill two holes, aligned horizontally, just over or under the crotch. Countersink bolt heads and nuts. If threaded rods are used, drill hole smaller than the rod and screw the rod into place. Seal bare surfaces with asphalt to keep out infection.

installed between each half of the crown at a point about halfway between crotch and top. For greatest strength, balance these cables, one on one side and another directly opposite it.

If the gap is narrow, any heavy asphalt (such as the kind used by roofers) will seal it. Some hardware stores sell special preparations for the purpose. You put on the material with a trowel or similar tool. If the gap is wide and not too deep, pour sand into it as a base to hold the asphalt. Seal the gap completely to prevent water from rotting the sound wood.

Threaded rods are available from supply houses serving tree surgeons. I get my supplies from A. M. Leonard & Son of Piqua, Ohio. The Redi-rods sold in hardware stores are adequate for smaller trees. Proportion the size of the rod to the size of the tree: ⅜″ diameter is adequate for medium-size trees, ⅞″ for exceptionally heavy trees.

Under no circumstances should the trunk be encircled with wires, chains, iron straps, or anything of the kind. Encirclement may hold the tree together, but since it makes no provision for growth, it means certain death. As the tree grows outward it will be strangled as surely as a man with a noose around his neck.

## The wrong way

**The tree will die** eventually if it is encircled with wires, chains, iron straps, or such. These will hold the tree together, but as the tree grows in circumference, it will be strangled.

**The author of a famous newspaper column lists the questions his readers most frequently ask**

# The 7 Home Repairs

**By Roger C. Whitman**
ILLUSTRATED BY CARL ROSE

IN THE past 23 years I've answered thousands of questions about home repairs. Most were asked by readers of my newspaper column, "First Aid for the Ailing House," but some developed from the radio programs I conducted for six years.

The questions cover the entire range of troubles that arise in a home. Some have had a humorous slant—like that of the

**1** ***How can I keep my house windows from clouding up?***

The basic cause of this cold-weather problem is condensation. When warm, humid house air strikes the cold glass, water vapor forms. Sometimes it's so heavy, it may trickle down the windowpane. In extreme cases, it can even freeze on the inside of the glass.

The simplest and most economical way to lower dampness is frequent and thorough ventilation on dry days. "Cracking" one or two windows on opposite sides of the house will change the air completely in a very few minutes. Even when it's very cold outdoors, this won't materially lower the house temperature because the ventilation is attained so quickly.

Hanging little bags of air-drying chemicals in different rooms is an inexpensive way of drawing moisture out of the air. But you can't let them get too soaked—they start to work in reverse. So you have to maintain a constant patrol, which isn't easy unless you never leave home.

Electric dehumidifiers are standard equipment in a few home-heating systems, but they are much more commonly bought as separate units. They do an efficient job and cost little to operate.

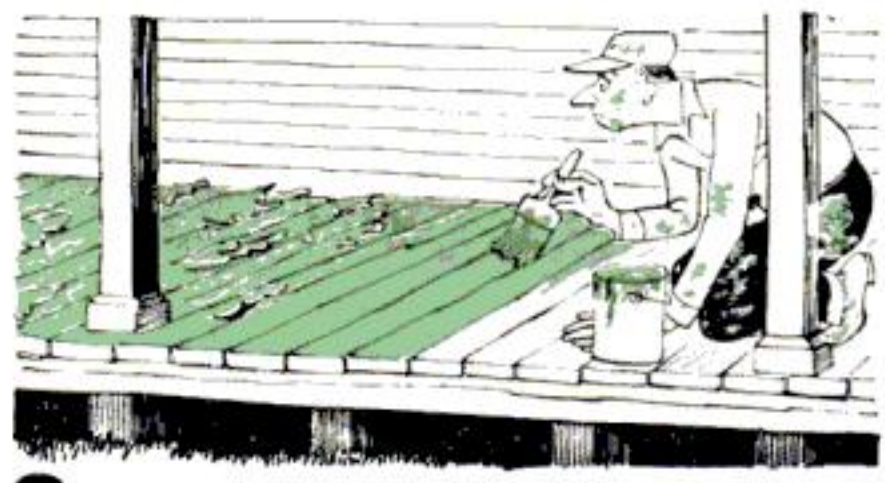
For damp closets, an aluminum-covered, rod-shaped electric heater is effective. It gently warms, dries, and circulates air throughout confined spaces—not only keeping dampness down, but effectively preventing mildew. It will also keep the interiors of piano cases dry.

In kitchen or laundry, wall fans help to keep vapors from spreading to the rest of the house. Ceiling fans are used where wall fans are impractical. Some ranges have built-in hood ventilators, or a separate range hood is installed.

If your house is brand new, or you're doing extensive remodeling with concrete and plaster, you can expect some dampness in the house for a time thereafter.

If steaming windows occur only during the first few days after turning on the heat in the fall, you can safely forget the problem. As soon as summer dampness has evaporated from carpets, curtains, and upholstery, you'll have no further trouble.

Of the seven home problems, window steaming is the only one that has increased in frequency in recent years. The reason? The amazing efficiency of modern insulating materials, tight-fitting storm sash, and the increasing number of work-saving appliances that emit water vapor.



**2** ***Why does the paint on my porch floor start to peel off only a month or two after I have so carefully put it on?***



Urheberrechtlich geschütztes Material

# You're Most Likely to Face

**man who asked whether painting one rat yellow would frighten all other rats out of the house. I couldn't answer that one.**

**In such a mass of questions, many are repeaters. From these it has been possible to determine what problems give home owners the most trouble. On these pages I have pinned down seven major problem areas and arranged them in order of decreasing frequency. By answering seven questions, each typical of its problem area, I can illustrate these home-owner headaches.**

Whether it's a porch floor, clapboard siding, concrete slab, or kitchen cabinets, paint will peel if the surface isn't both clean and dry.

In the case of a porch floor, you usually don't paint the underside. So there's nothing to prevent ground dampness from rising into the wood and working through to the top side. When moisture works to any surface, it pushes off any paint that's in the way. (Exception: the latex paints that allow wood to "breathe." But these aren't made for floors.)

The answer is to paint the underside of the floor to seal out dampness. Aluminum paint is good for this. You can also cover bare earth under the porch with a vapor barrier, using overlapping layers of roll roofing or sheet plastic. For best results, seal the edges of the laps with cement.

When you build a porch or any wood floor over the ground, paint all sides and edges of the lumber first.

You can expect peeling when paint is applied to an unclean surface. Kitchen woodwork or cabinets are often filmed with cooking greases. If you expect paint, enamel, or varnish to stay on, see that the surface is as close to surgically clean as you and turps can make it!

When paint peels off a concrete floor, check for surface dampness due to condensation or ground dampness working up through the slab itself.

Condensation must be cured by making the air in the house less humid. But if the dampness is coming through the slab, you'd better have a serious talk with your builder. He probably didn't put in a waterproofing barrier of plastic over a drainage bed of cinders before pouring the concrete. Now you'll probably need a waterproofing layer over your slab floor, followed by another layer of covering.

**3** ***How can I seal a wet basement wall against seepage?***

Before the development of brush-on sealing finishes, this waterproofing job was a big one. Having it done was expensive. For best results, you had to excavate to the footings, then coat the outside of the foundation wall with hot tar, followed by a layer of asphalt-saturated roll roofing (or its equivalent). Installing underground drain tile was also recommended.

But with brush-on waterproofing on hand, this formerly tough job has become easier. New products work by fusing to the concrete and forming an impenetrable shield. Water can't pass through when they are applied as directed. All are most effective on bare concrete; the more loose paint you can wire-brush off, the better.

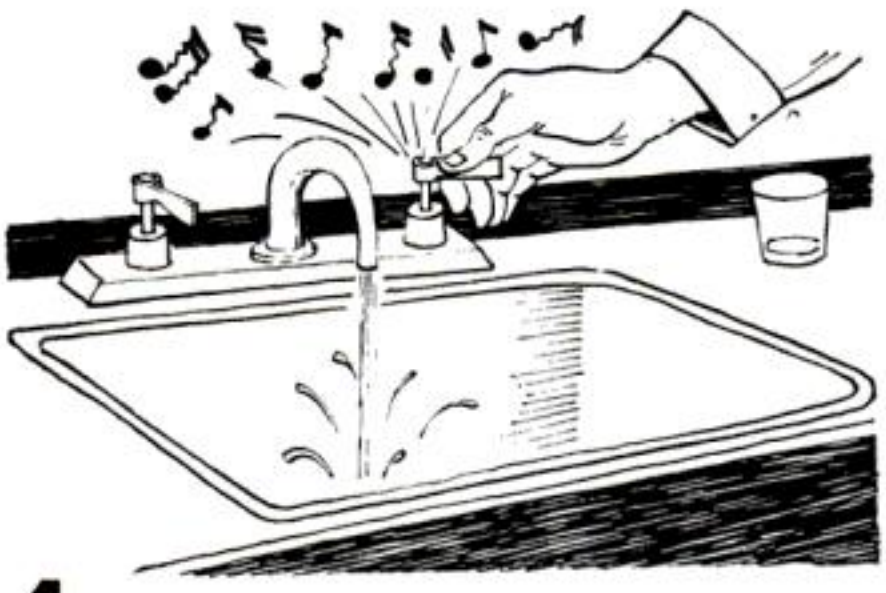
Another new product, latex patching concrete, is a time- and labor-saver of the first rank. All you do is work the mixture

CONTINUED



Urheberrechtlich geschütztes Material

into the crack. No need to widen the crack with a cold chisel, presoak with water, or keep the repair wet down for a week afterward for proper curing. Just trowel the stuff into the crack, smooth it level, and walk away. Try it next time and see for yourself.



**4** ***My kitchen faucet has begun to chatter and knock. How can I fix this?***

The noise undoubtedly is due to a washer so worn that the screw at the bottom of the stem can't hold it firmly. As it vibrates on the screw, you get chattering. You need a replacement, plus a simple repair job to keep the new washer in good shape.

At a hardware store buy a kit—for $1.50 or so—for replacing washers. The kit should include a seat-dressing tool.

Shut off the water. Next pull out the faucet stem so you can get at the worn washer at the bottom. If you are not sure how to do this, describe the faucet to your hardware dealer and he may be able to advise you.

In a pinch, you can sometimes make a temporary, but satisfactory, fix for a chattering or dripping faucet simply by reversing the washer.

**5** ***Ever since a highway was built close by, cracks have appeared in my plaster walls. If I fill them with patching plaster, new cracks soon appear. What else can I try that will last?***

Why not attack the problem by hiding the cracks completely? Cover the affected walls with painter's cloth, also called painter's muslin. A closely woven canvas-like fabric, it comes in rolls like wallpaper and is applied the same way. Then you can paint or paper over it. Paneling, drywall, decorator's burlap, or other types of wall covering material will also hide the cracks.

Most of the time, however, you fill a plaster crack because you don't expect it to happen again. The standard method is to widen the crack to ½″ to 1″, with the inside width greater than at the surface so the patching plaster will wedge itself in as it dries. Both sides of the crack are sprinkled, to prevent the surrounding dry plaster from absorbing water from the wet patching plaster. Then the patching material is packed in and troweled smooth.

There may be shrinkage as the plaster dries—sometimes as much as ⅛″. So a second coat may be needed to bring the repair level with the surface.

**6** ***Humid weather has given our carpeting and upholstery a musty odor. How can I get rid of this odor?***

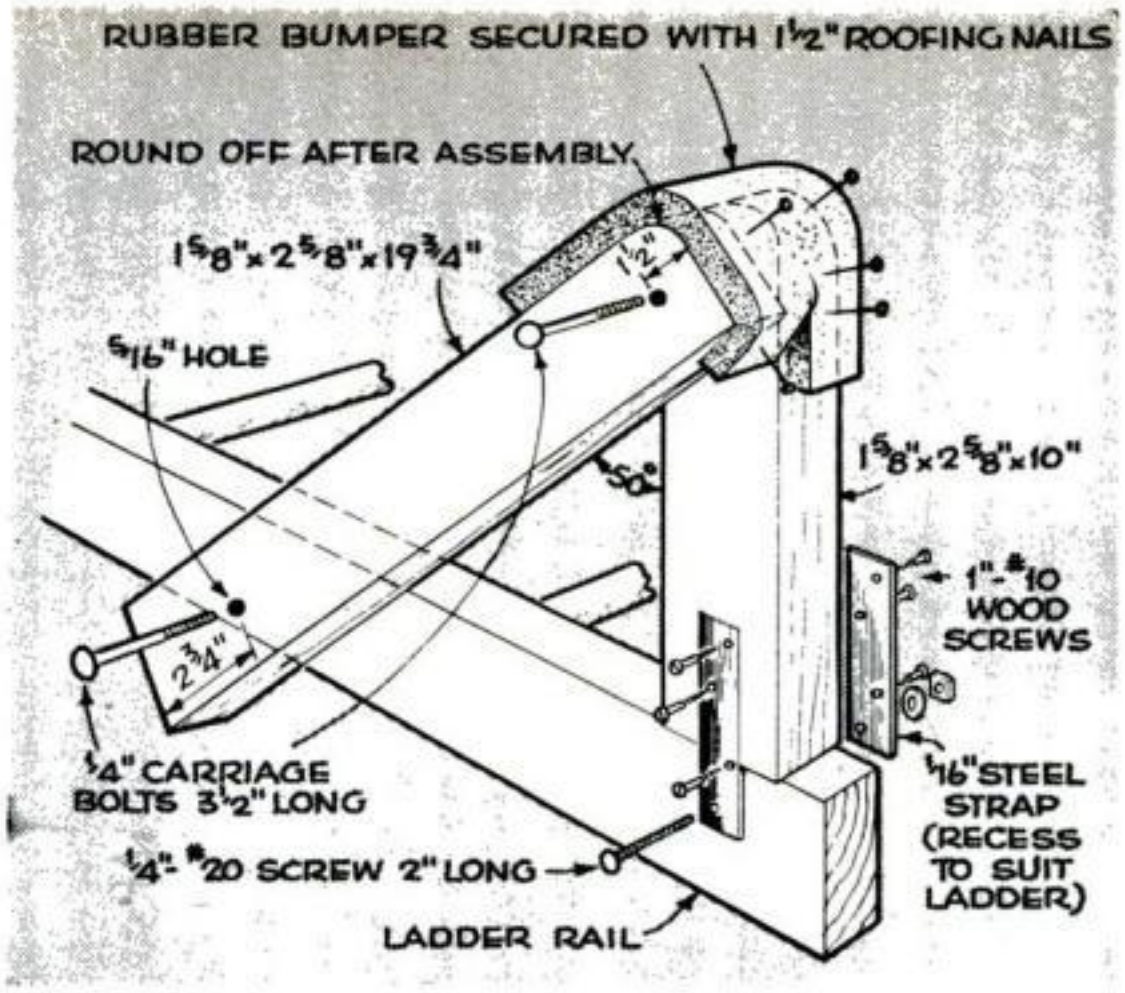
Where mildew is a problem, a good wall-to-wall carpet deserves prompt attention from a professional cleaner. While he has it, the floor will have a chance to dry out. Spray the floor with a mildewcide to kill any spores. Be sure the floor is completely dry (if necessary, use a heater) before the rug or carpeting is relaid.

With rugs you can handle at home, try thorough airing in the sun, followed by a spraying with a mildewcide. If you catch the mildew in its early stages, you can often head off further development.

Air upholstered furniture (or mattresses) in the sun for a week or so. If this doesn't drive out the odor, there's nothing practical short of restuffing the furniture and replacing the mattress.

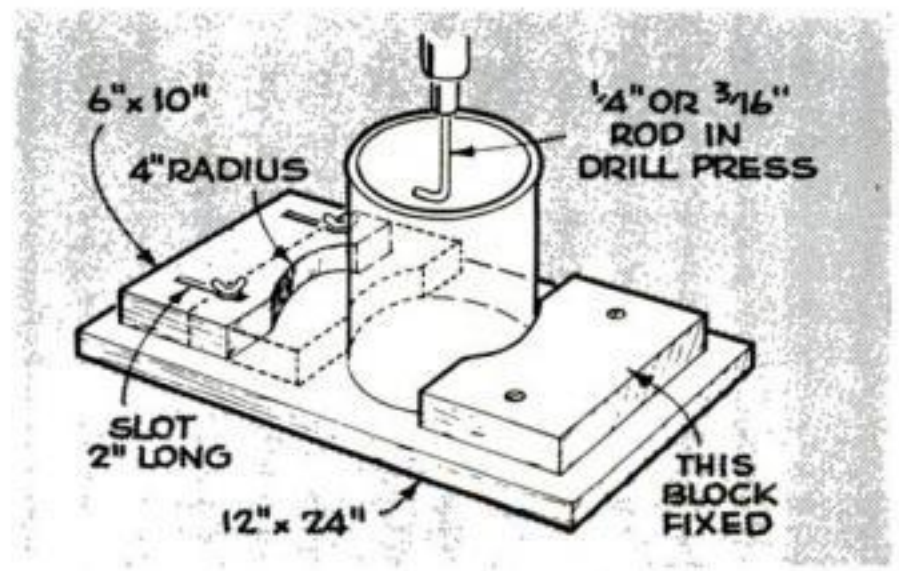
Mildew strikes on many fronts. The major contributors to its development are warm, damp, and dark spaces where there's

[*Continued on page 210*]




## Stand-off ladder bracket

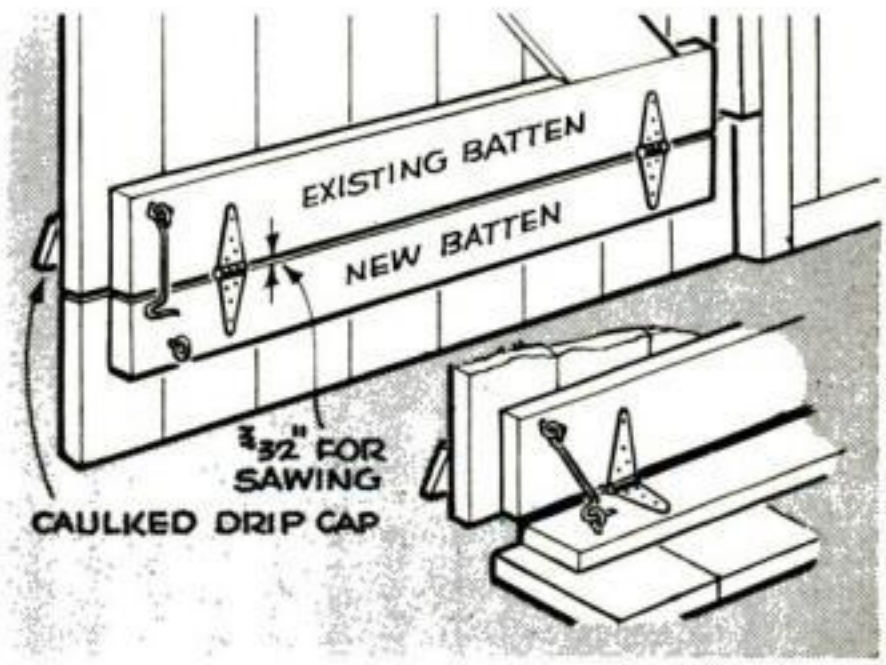
Attached to the end of a ladder, the assembly above puts you out where it's easier to work on the gutters of a house with a wide soffit. Select a knot-free two-by-three for the two pieces needed for each rail of the ladder. You may have to cut a recess in the 10" piece for the steel strap that holds it to the ladder rail. Note that the 19¾" piece is bolted outside the rail, giving a wide base for safety. The rubber bumper can be cut from a kneeling pad.—*W. M. Schneider Jr., Wayne, Pa.*




## A jig to mechanize paint mixing

The job of mixing paint thoroughly can be mechanized by using a plywood fixture to confine the paint can and a length of steel rod, bent for drill-press mixing.

Choose a piece of plywood large enough to clamp to the drill-press table. To this, fasten permanent and adjustable cleats as shown. Run the drill press slowly, adjusting the bent rod to several levels for thorough mixing.—*E. Wieczorek, Chicago.*




## A time-saver when the snow drifts

When you wake on a winter morning and find a new fall of snow, this trick makes it unnecessary to spend time shoveling a clear space in front of swinging garage doors. A strip along the bottom of each door swings inward. The door will then clear a considerable depth of snow. A hook holds the strip up.—*T. Barney, NYC.*



Urheberrechtlich geschütztes Material

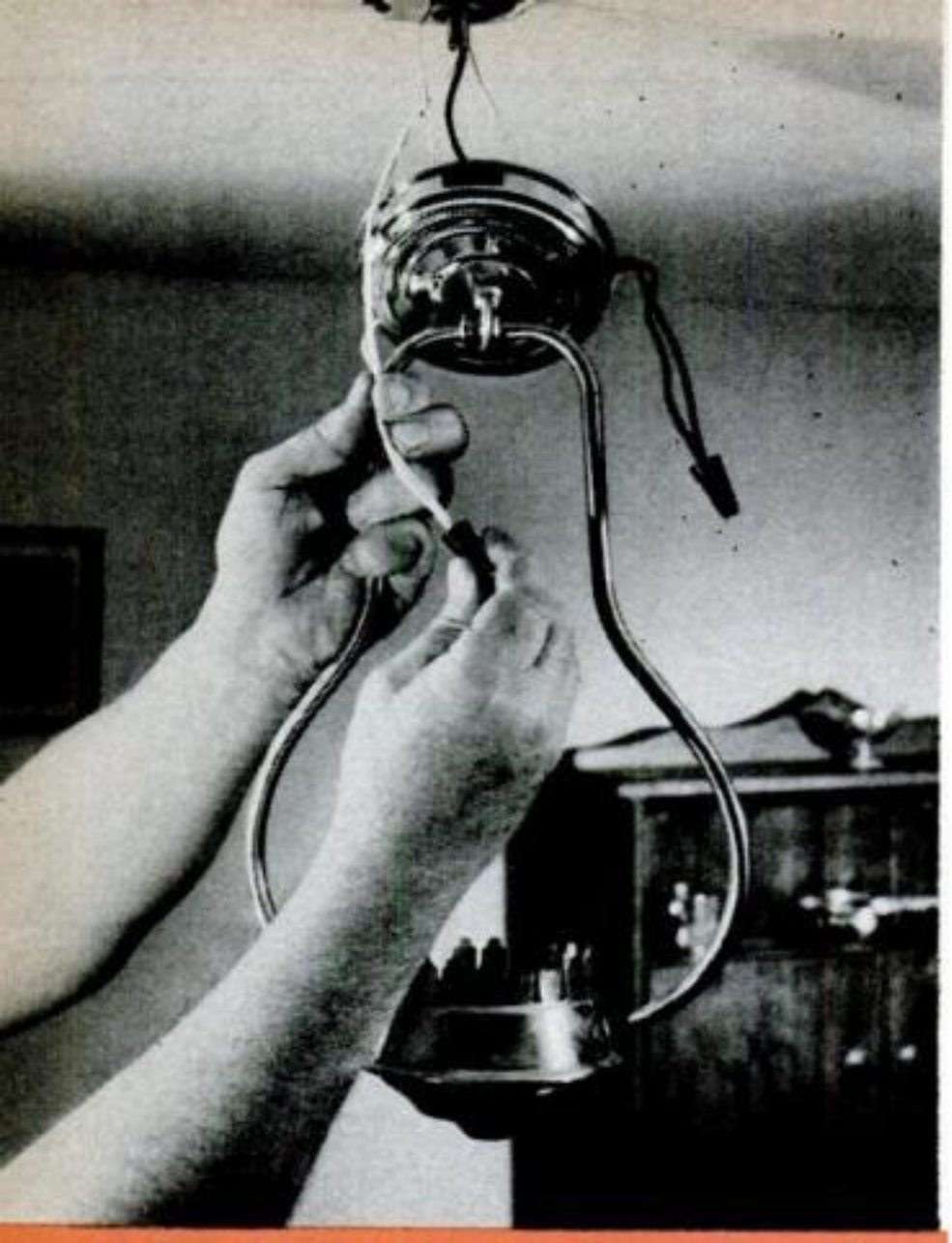
## PS Money-Saving Series:

# Improving

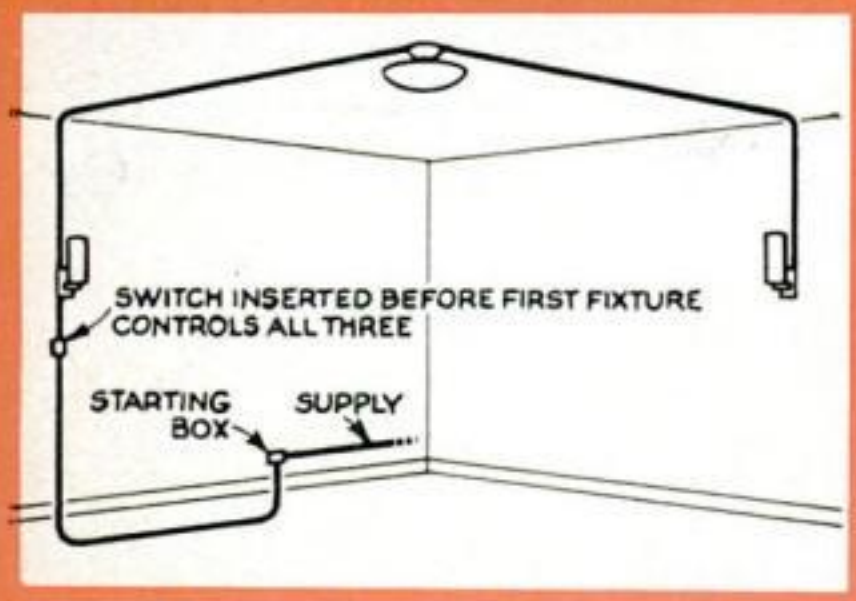
### By George Daniels

ONCE you've decided where you want new lighting fixtures, you must pick a handy place to connect their cables into the power supply. This may be at either an outlet box or a junction box. It need not be in the same room or even on the same floor, as you can lead the cable through walls, floors, or ceilings.

Outlet boxes are usually the best bet, but the box must be at the end of a cable run so only one cable is already connected to it. This lets you add your new cable without exceeding the number of wires permitted in the box—four or five in typical outlet-box sizes. (You don't count the bare grounding wire now included in the cable.) Also, as only the two wires from the existing cable connect to the re-

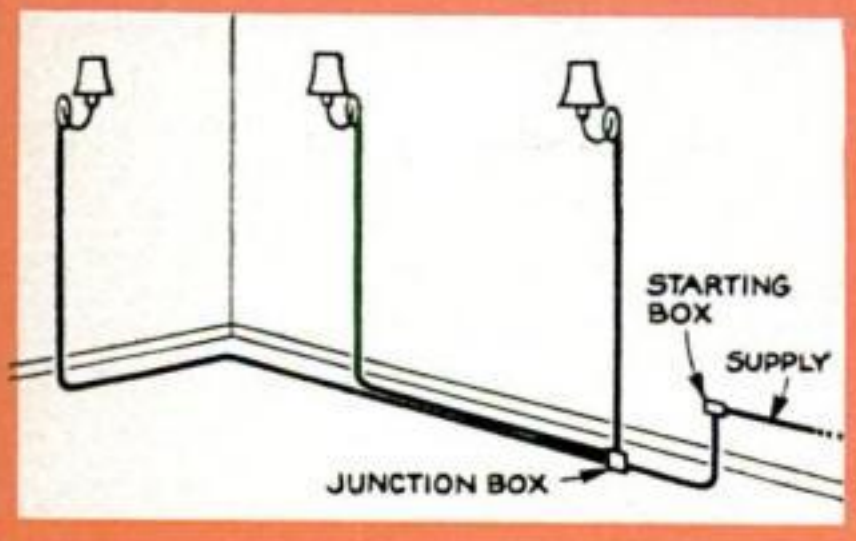


**Built-in clamp** locks this fixture to nipple in box, allows it to face in any direction. Tip: While connecting, hang fixture from box on stiff wire hook. This leaves hands free.



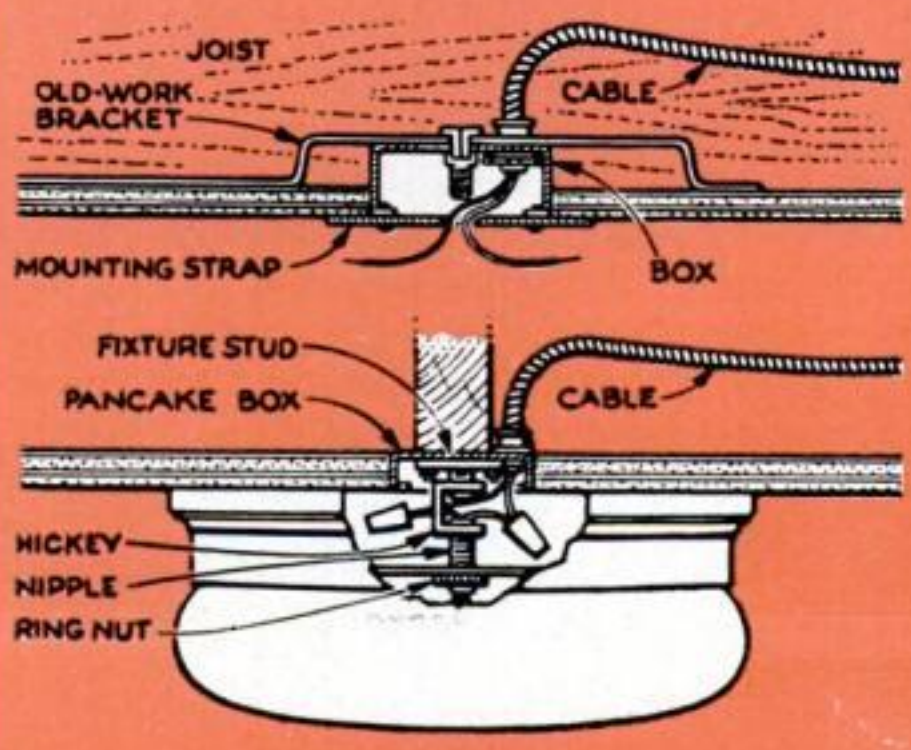

**Suit cable route to situation**—if attic is not floored, cable may cross it in any direction to link fixtures. Use a large box at ceiling fixture for additional cable splices.

**If attic is floored**, cable can't run crosswise of joists, so basement is best multifixture cable route. Use switched fixtures or wire wall switch from the junction box.




## Mounting and wiring wall

**For average fixtures** use old-work bracket to mount fixture box from below, after snaking cable to box, as on following pages. Bracket rests on upper surface of ceiling's wallboard; mounting strap locks against lower surface (upper sketch below). Box for heavy fixture may be fastened directly to joist with screws also holding fixture stud. Open-sided hickey couples nipple to stud and allows fixture wires (through nipple) to come out in box for connection to cable (lower sketch). Follow color code: Connect wires black to black, white to white.



# Your Home Wiring

## *THIS MONTH: Wiring new light fixtures*

ceptacle, two of its four terminal screws are unused.

It's easy to spot an end-of-run box where cables are visible in the basement. Upstairs, you'll have to shut off the current (at the main switch) and remove the outlet cover plates until you locate a box with only two wires entering it. When you find the box, put the cover back and switch on the juice again. Make the actual connection as the final step of the wiring job.

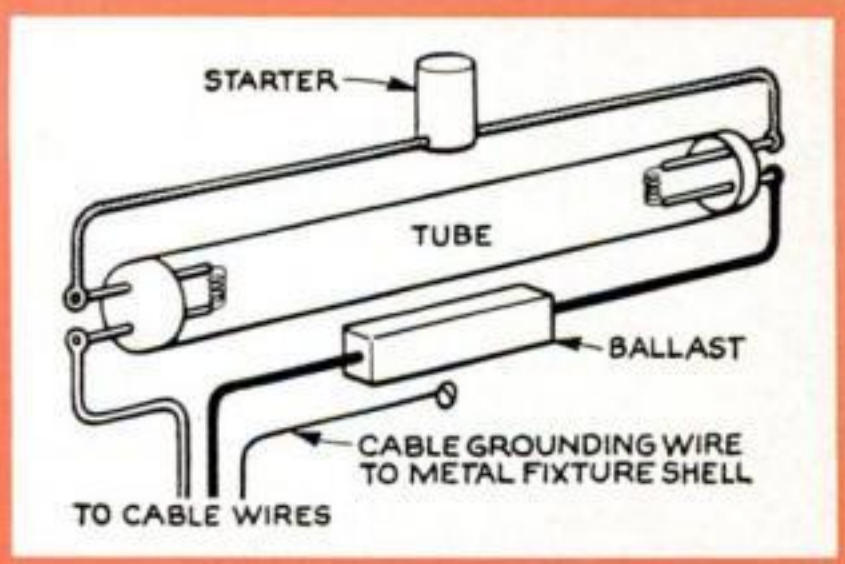
Junction boxes are the square or octagonal type you see in basements. They enclose wire splices where cables interconnect. Inside, the wires from the supply cable (which comes from the fuse panel) are connected to the wires of the other cables. As these boxes are usually much larger than outlet boxes, more wires are permitted in them. A box 2⅛" deep and 4 11/16" square, for example, can take 20 No. 14 wires. (For other sizes, check your local code.) There's one very important precaution in selecting a junction box to start new wiring: Trace the existing cables from the box to make sure they run to 115-volt outlets, *not* to 230-volt appliances.

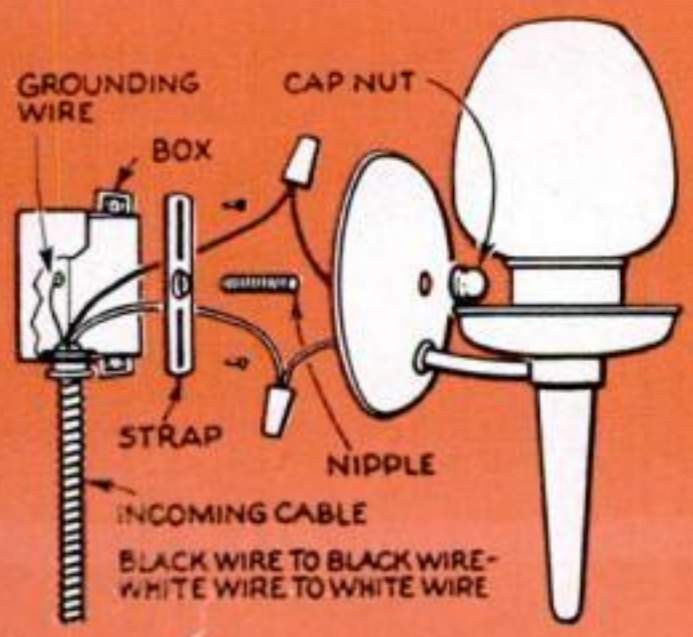
***The color code.*** To make the right connections at either type of box, follow the basic color-coding rules. You'll be using two-wire cable, which contains a black insulated wire, a white insulated wire, and a bare grounding wire. If you start from an outlet box, the white wire must be connected to the receptacle's chrome terminal screw, the black one to the brass screw.

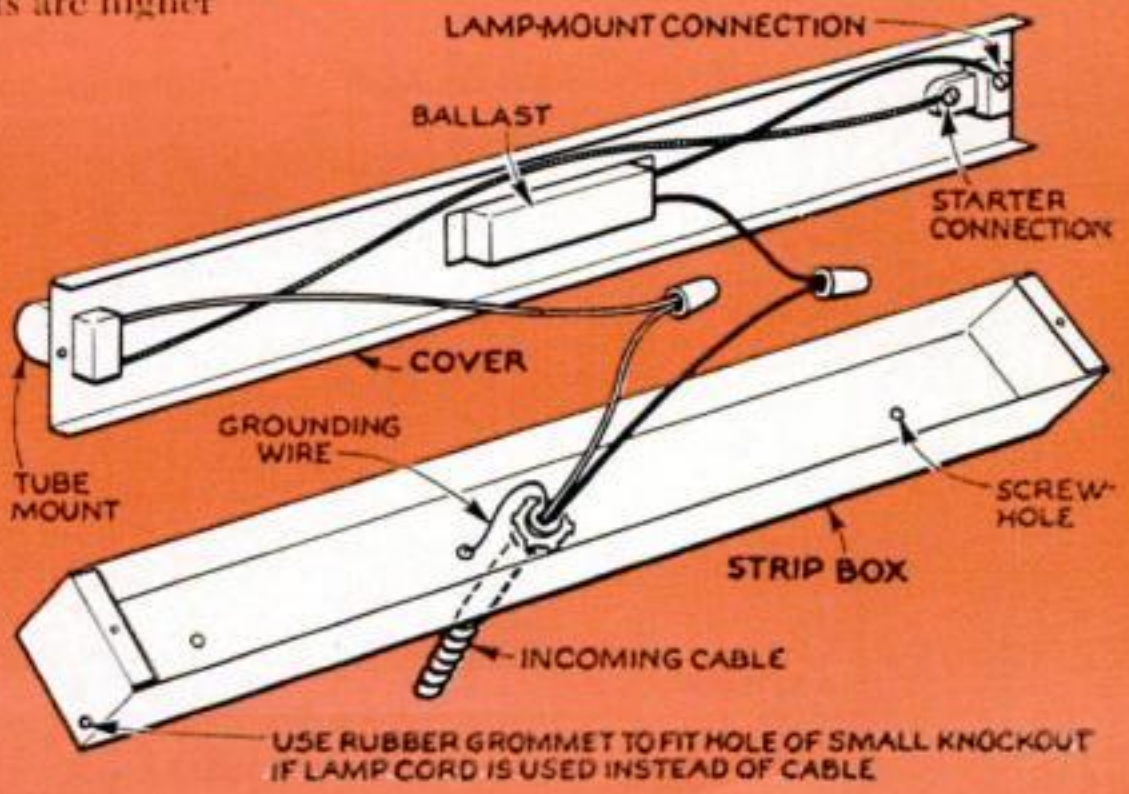
CONTINUED

## and ceiling fixtures

**Bulb fixtures and fluorescents** follow the same black-to-black, white-to-white wiring rule. Typical wall-fixture mounting is shown below; fluorescent strip is at lower right. Latter may also be box-mounted. Because of ballast heat, don't mount a fixture directly on a combustible wall. Use air-space blocks or brackets. If a fluorescent unit is not ready-wired when you buy it, use the diagram at right as a guide in connecting parts of the starter-type circuit. If a fixture is instant- or rapid-start type (no starter), get instructions when you buy unless it is completely wired. Quick-starting units are higher priced and vary in wiring details.



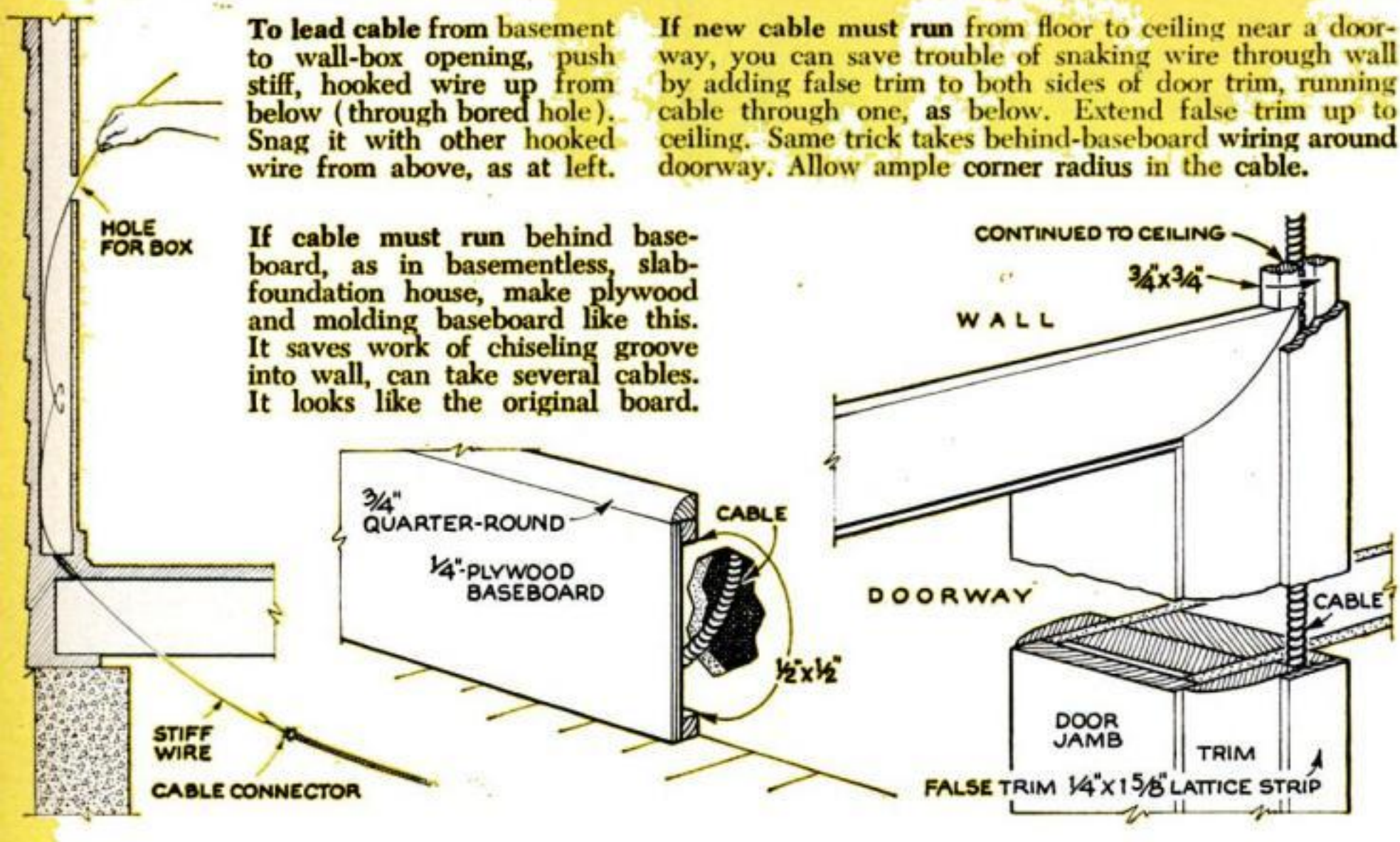



## Tips on snaking cables through the walls

**To lead cable** from basement to wall-box opening, push stiff, hooked wire up from below (through bored hole). Snag it with other hooked wire from above, as at left.

**If new cable must run** from floor to ceiling near a doorway, you can save trouble of snaking wire through wall by adding false trim to both sides of door trim, running cable through one, as below. Extend false trim up to ceiling. Same trick takes behind-baseboard **wiring around** doorway. Allow ample **corner radius** in the **cable.**


HOLE FOR BOX
If cable must run behind baseboard, as in basementless, slab-foundation house, make plywood and molding baseboard like this. It saves work of chiseling groove into wall, can take several cables. It looks like the original board.
3/4" QUARTER-ROUND
1/4"-PLYWOOD BASEBOARD
CABLE
1/2"x1/2"
STIFF WIRE
CABLE CONNECTOR
CONTINUED TO CEILING
3/4"x3/4"
WALL
DOORWAY
CABLE
DOOR JAMB
TRIM
FALSE TRIM 1/4"x1 5/8" LATTICE STRIP

The bare grounding wire connects to the box itself. Newer boxes have a screw in the back for this. Otherwise, you buy spring connecting clips. (Ask about these when you buy materials.)

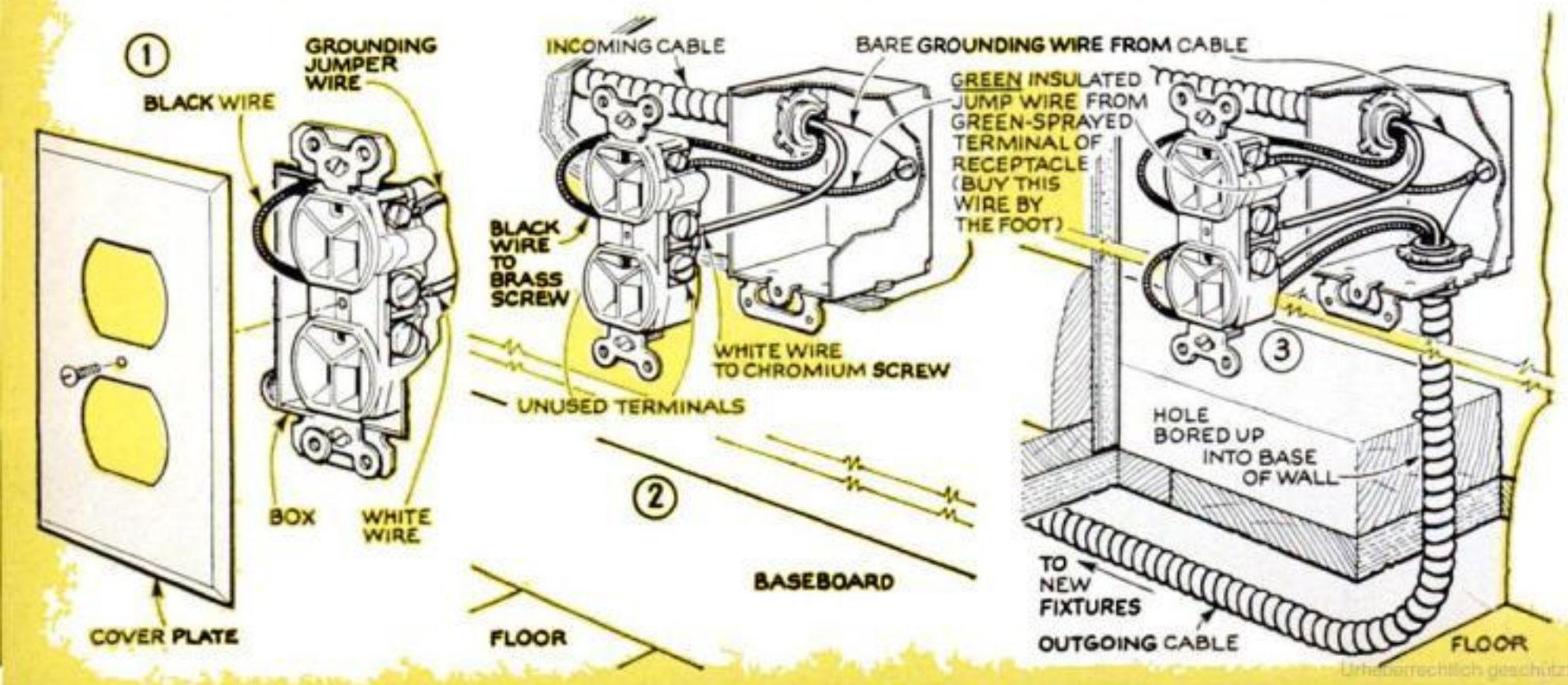
If you start from a junction box, your white wire must be connected to the white wires in the box, the black to the black wires in the box. (The importance of this is emphasized by the fact that white wire

## Starting cables from an outlet box

**1. Find outlet box** at end of cable run by removing cover plates. Only one brass and one chrome terminal will have wire connected, leaving two unused, as below. If receptacle is grounded, it should have jumper wire.

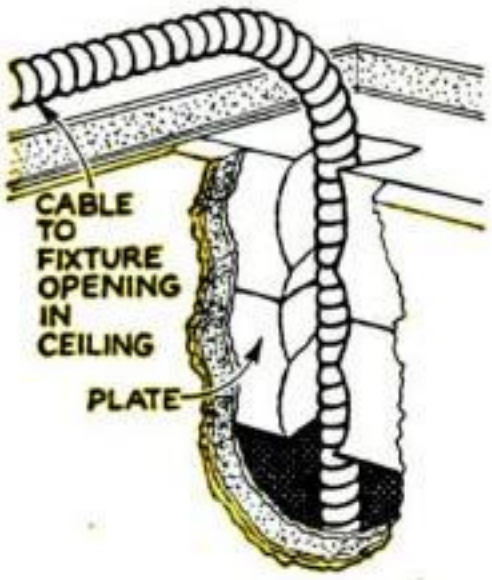
**2. Remove receptacle** mounting screws, pull receptacle out (still connected). It looks like this (below). Current must be off. Jumper wire should have green insulation. Open knockout to take new run to fixture.

**3. Connect cable wires** for new run like this. Bare grounding wire of new cable connects to box just like grounding wire of existing cable. Black wire goes to unused brass terminal of receptacle, white wire to chrome one. Existing jumper wire remains. Allow about 8" of free wire (from cable) inside box to make connections. New cable should enter at knockout best suited to direction cable will run.



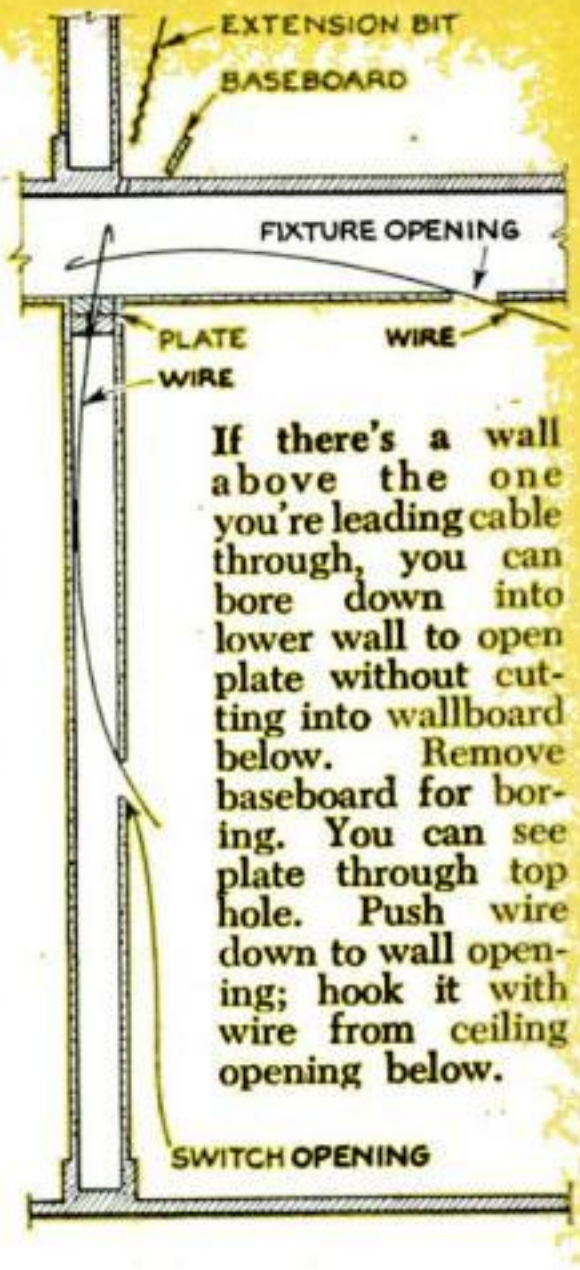

Urheberrechtlich geschütztes Material

**Double two-by-four plate** must be drill-notched to pass in-the-wall cable into ceiling space (below).




**Chisel out** wallboard at notch point. Bore overlapping ¾" holes about 1" deep. Trim with chisel. Drill's up-angle opens plate top. Tack screen over notched wood to take a spackle patch.

**If wall has fire-stop** crosspieces between studs, fish tape or wire will be blocked, indicating fire-stop location. Open wall there; notch the fire stop. Drop weighted string to the opening. Use hooked wire to snag upcoming wire below; then tie it to string and pull it up to plate notch. Tie string loop to hooked wire, push loop into ceiling, snag with wire from ceiling opening, and haul through. Use the same method on any job. Without wall opening, you need a hole behind baseboard.



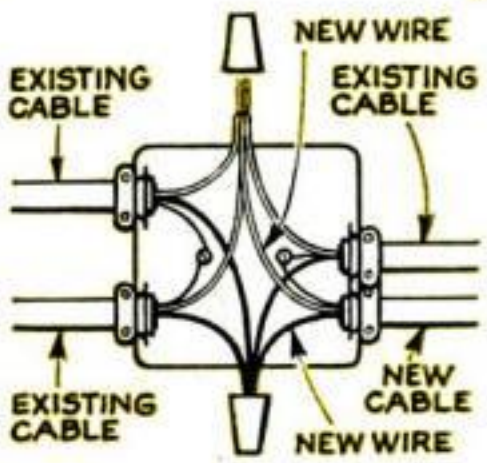

**If there's a** wall above the one you're leading cable through, you can bore down into lower wall to open plate without cutting into wallboard below. Remove baseboard for boring. You can see plate through top hole. Push wire down to wall opening; hook it with wire from ceiling opening below.

must be used in place of black in certain switching circuits because cable isn't made with two black wires. In such cases, the visible ends of the white wire must be painted black.) The bare grounding wire is connected to the junction box as in an outlet box.

At switches, only black wire (or a black-painted one) is ever connected to the switch terminals. To maintain the color coding,

## Starting from a junction box

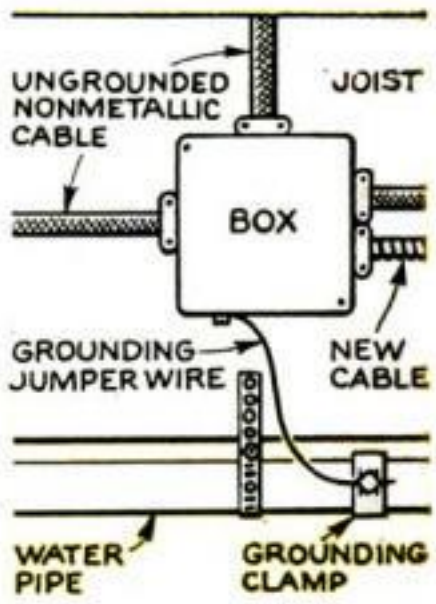
**Before starting** from junction box, check cables leading from it to make sure they go to 115-volt outlets or fixtures, not to 230-volt appliances. Inside, you'll find wires connected white-to-white, black-to-black, usually with solderless connectors. Unscrew connector from white group, add white wire from your new cable, and replace connector. Do the same with black group and new black wire, as in sketch at top right. Connect bare grounding wire of new cable to metal box whether existing cables have similar wires or not. Allow about 8" of free wire from cable for connections inside box. Bare wire ends to fit all the way inside connector. If connector can't take an extra wire, you can often solve problem by buying larger connector. Electrical suppliers stock different sizes.




**If larger connector** won't solve added wire problem, remove one wire (A, sketch below). Replace it with short wire of same color leading to a new connector. At new connector, splice it to removed wire (A) and to your new cable wire of same color. Do the same with wires of other color, adding another connector.

### If your starting box is not properly grounded. . .

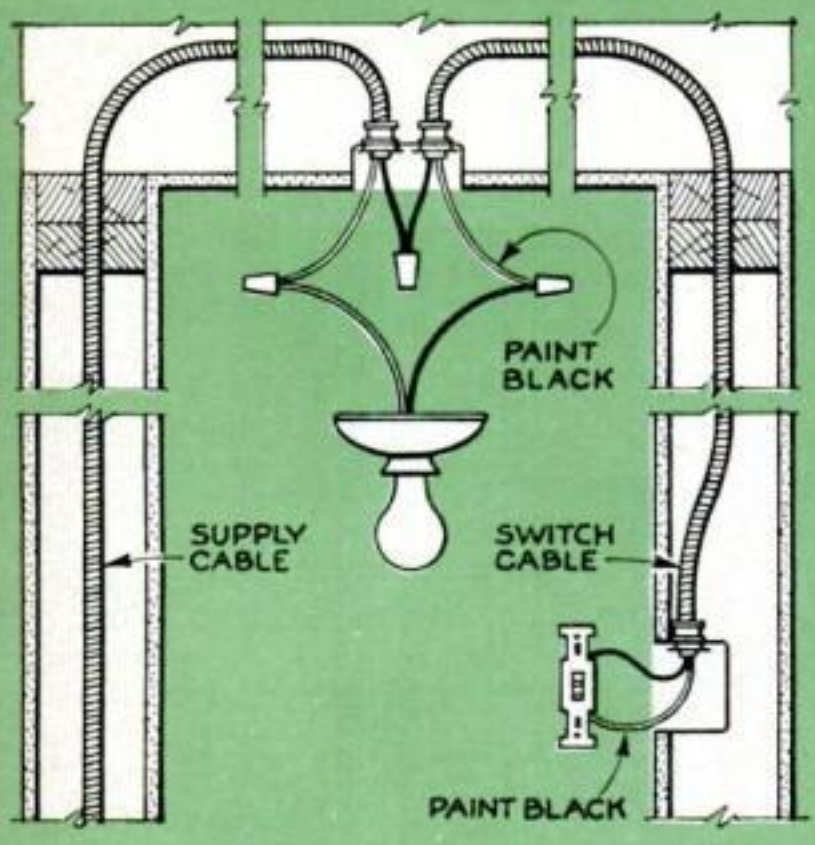
**In some old houses** original wiring does not provide good ground at boxes, so hot wire could contact box without blowing fuse—dangerous. You can ground box to nearby water pipe if pipe connects to one that fuse panel is grounded to, and if electrical contact is sound between the connections.



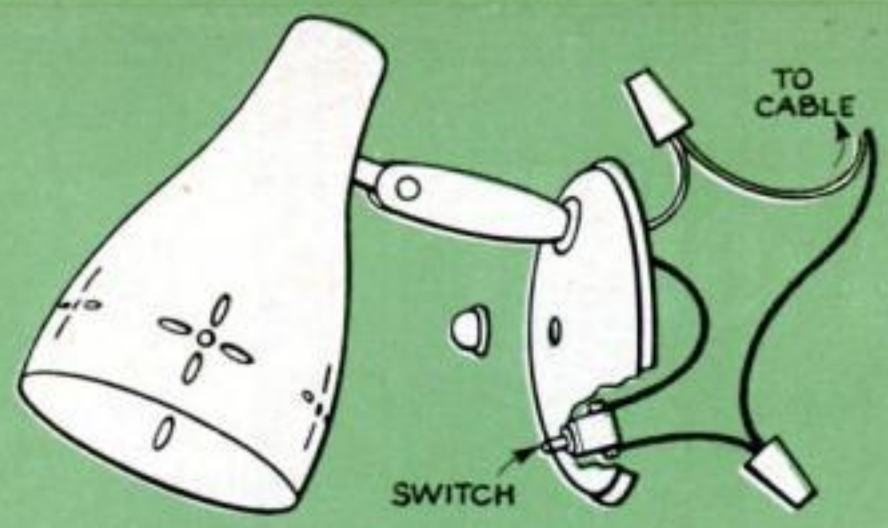

**To check the ground** of any box, use a pigtail bulb socket, as in sketch below. With current off, connect black lead to black supply wire (or brass receptacle terminal), white one to metal box. If bulb lights when current is on, ground is okay. If not, the box must be grounded.

Urheberrechtlich geschütztes Material

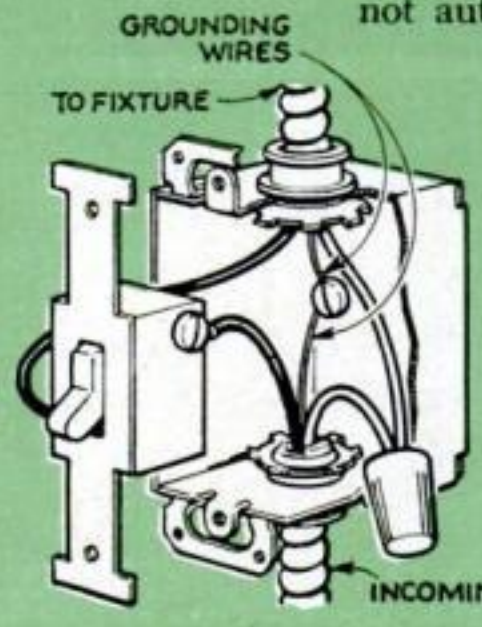
## Simple switch wiring




**To replace pull-chain switch** on a fixture with a wall switch not located along the supply cable, wire the new switch cable as in drawing above. As new cable will have white wire and black wire, white one must be painted black at ends to keep the color-code rule, since the switch is connected only into the black—or hot—wire.




**To add switch** to fixture itself, connect it on black-wire side, as above. Be sure switch is designed for 115-volt use, not automobile wiring.




**If wall switch** is inserted in supply cable, black wire of incoming cable connects to one switch terminal, black wire of outgoing cable to other terminal. White wires of both cables are spliced together (left).

both switch terminals are brass. The bare grounding wire connects to the box, as usual. The reason for strict adherence to color coding: It keeps opposite sides of the circuit apart throughout the system and prevents errors that could produce shock hazards. It also assures safety in future alterations.

***Adding one fixture or several?*** If you're adding a single fixture, say a ceiling light, you merely run your cable from the starting box to the fixture, with a wall switch along the line, unless the fixture has a pull chain. If you're adding several fixtures, you have a choice of two wiring methods. You can run your cable from the starting box to the first one, as with a single fixture, and continue it on from one to another. Or you can lead from the starting box to a new junction box (you can mount it on a basement ceiling joist) and splice to cables leading to the other fixtures.

Your best bet: Pick the easiest way for the situation even if it requires a little more cable. The lights may be controlled by separate switches or by a single one, as required. (Only one basic switch arrangement is shown. A complete roundup of switching systems will be covered in a coming issue.)

***Wiring to wall and ceiling fixtures.*** To cover all common methods of leading cable through the house, let's say you want to install a pair of wall fixtures, one on each side of the dining room, and a ceiling fixture. We'll suppose the wiring is to start from an outlet in the living room.

Begin by mapping out the path the cable will take. Usually the best route from a first-floor outlet is down through the floor and across the basement ceiling to points directly under wall-fixture locations. Cable to a ceiling fixture may take a similar route and run all the way up a wall of a room, then across the ceiling. Or it may run directly up from the starting box and across the attic to the fixture. Still other alternatives are described later.

Measure the cable needed to reach all fixtures by the route you decide on. If you're using BX cable, allow about 6″ extra for each right-angle bend. Buy a cable connector for each point where the cable enters or leaves a box (unless the box has built-in cable clamps) and allow 8″ extra cable at all such points to provide the free



Urheberrechtlich geschütztes Material

wire needed inside the box. For the work shown, you'll be using two-wire cable, and for most lighting loads the wire can be No. 14.

If you're adding a junction box to splice several cable runs, pick one 1½″ deep and 4″ square. This provides ample working space inside and can take 11 No. 14 wires.

***The new box.*** Start the job by cutting openings for the wall-fixture boxes. Wall-fixture height above the floor is usually 5′ 6″ to 5′ 10″. Before cutting, be sure the openings will be between studs. Check by pushing an icepick through.

If you plan to run cable from the basement, bore ⅝″ holes upward through the floor into the base of the walls directly under the starting box and the fixture locations. Buy boxes with built-in cable clamps to simplify the job. If the starting box lacks clamps, make the hole through the floor under it big enough to pass a cable connector, as one must be on the cable end when it is led up from the basement.

To lead the cable from basement to wall openings, first push a stiff, hook-ended wire up into the wall from the basement, and another down from the wall opening. Move the upper one around inside the wall to link hooks with the lower one; then pull the lower one up through the wall opening. The cable may then be attached to the lower end of the wire.

Hammer-tap or pry open a knockout hole in the bottom of each new box to take the cable, and remove 8″ of armor from the end if you're using BX. Also, slip a fiber bushing into the armor end to protect the wires from chafing. Then push the cable into the knockout hole and bend the free wires down over the box to keep them from slipping out before you secure them.

The box may now be pushed into the wall. If the box has built-in side clamps, you simply tighten their screws from the front to lock them. If the box has no clamps, you can slip sheet-metal ones into the wall beside it, and bend their protruding tabs inside the box. Finish by pulling the cable snugly into the cable clamps and tightening them.

***Connecting the fixture.*** Most modern fixtures have a black wire and a white wire. You also have the black and white wires from the cable. Simply connect the two pairs—black to black, white to white—using solderless connectors. To make a connection, hold the bared end of the fixture wire tightly alongside the bared end of the cable wire and screw the connector on like a nut. The wire ends should be bared just far enough so no bared wire is left exposed. If both fixture wires are the same color (as on some older types), the wire leading to the *outer screw shell* of the bulb sockets should always be connected to the *white* cable wire. The wire from the socket's center contact always goes to the supply-cable black wire. The cable grounding wire is connected to the box at the screw provided in new boxes. (Be sure the boxes you buy have the screw or a threaded hole for it—and buy screws to fit.)

The cable in the basement must now be fastened in place (you are working from the fixtures back to the starting box). If it runs crosswise of the joists (beams), bore ⅝″ holes through the joists and lead it through them. If parallel to the joists, fasten it every 4½″ and within 1′ of any box. Use staples made for the purpose to fasten BX, mounting straps to fasten non-metallic cable.

If you're splicing several cable runs in a new junction box, simply connect all white wires (including the one to the starting box) together, and all black wires in the same way. You can use large solderless connectors for large numbers of wires. Buy them accordingly. The bare grounding wires from all the cables attach to the box. If the box has several grounding screws, use them all rather than clump all wires under one screw.

To lead the cable into the starting box, shut off the current. Pull the main switch or unscrew the fuse that supplies the box. (But make sure you have the right fuse by testing the outlet with a lamp.)

Remove the mounting screws that hold the receptacle in the box and pull it out, but don't disconnect it. Hold the blade of a heavy screwdriver against a knockout in the bottom of the starting box and tap the handle with a hammer to open the knockout. Push a stiff, hook-ended wire up from the basement, as before, and another

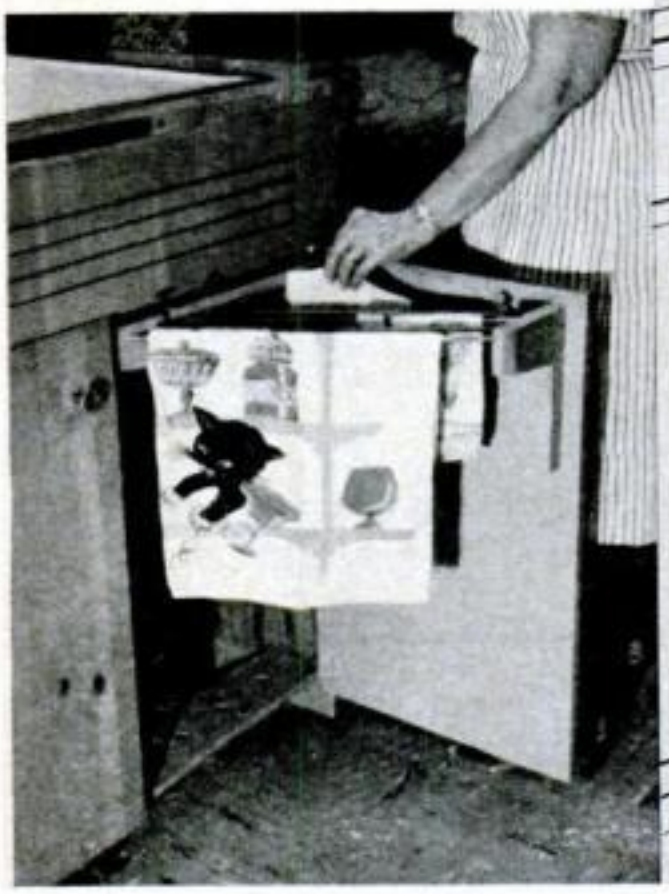
[*Continued on page 192*]

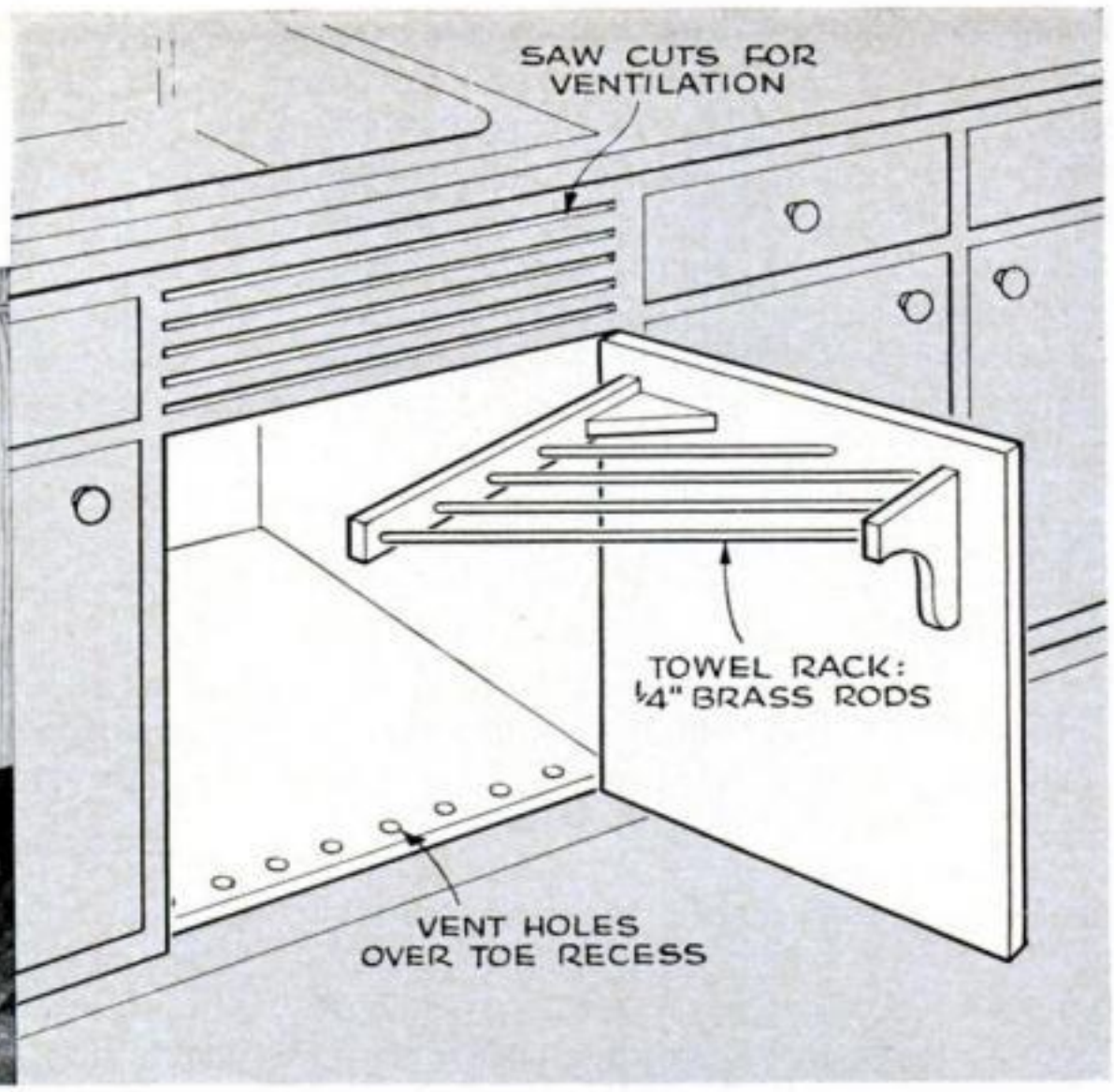
## NEXT MONTH: Wiring your home shop for power



Urheberrechtlich geschütztes Material

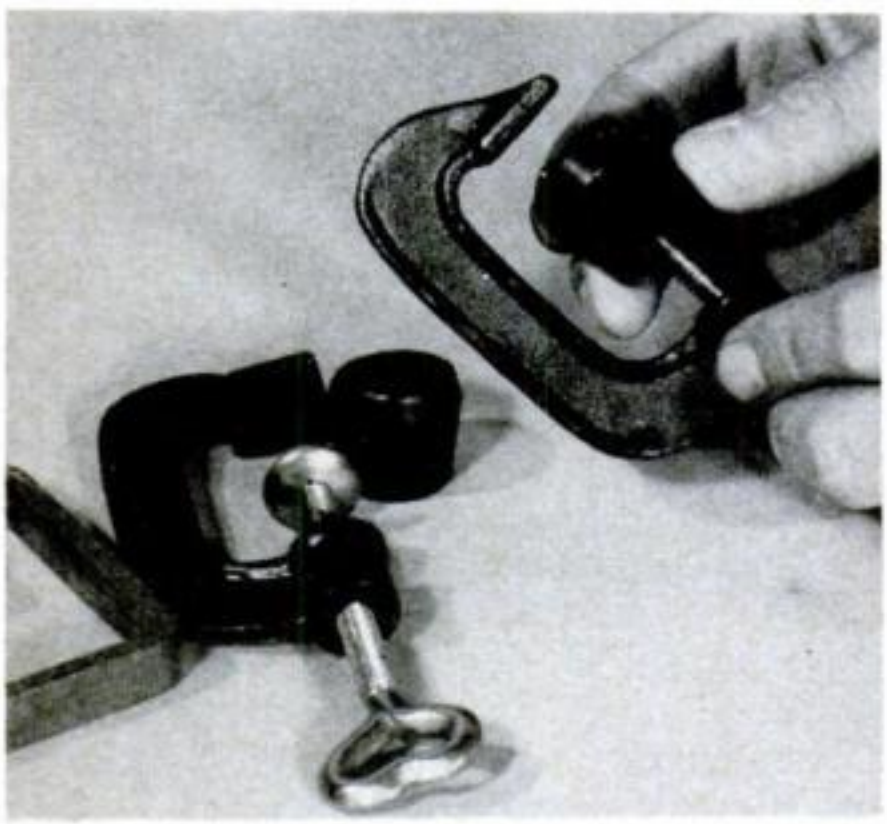
# Short Cuts and Tips FROM PS READERS






## Concealing a towel rack

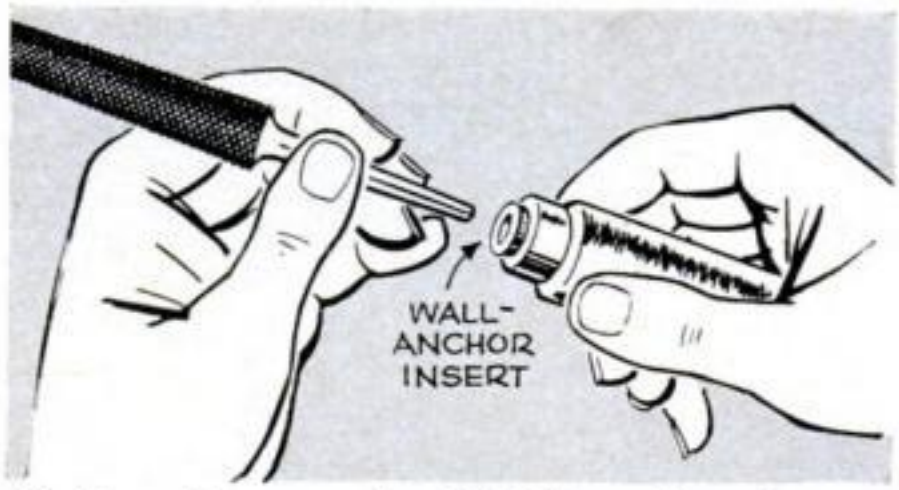
Here's a neat way to make a rack for drying towels and dishcloths. It keeps them out of sight, yet handy. Made of plywood and ¼" brass rods, the rack is attached to a door, preferably under the sink. Saw cuts above the door, and holes along the toeboard below, provide the necessary ventilation for drying. In my setup, the adjacent compartment stores paper toweling and a trash bag.—*Edward Horr, Hickory, N.C.*



## Rubber glides end surface scratches

After having scratched several wooden surfaces in the process of gluing with C clamps, I discovered this trick. A couple of plastic furniture glides are all you need. Slip the glides over the C clamps, as shown above, and they serve as protective cushions, preventing damage to the surface.—*Ken Patterson, Regina, Sask.*

▶▶▶ Clean circular-saw and band-saw blades of gum and pitch by applying full-strength ammonia with a stiff brush. After 10 minutes, coat again, using the brush to remove loosened debris. Wipe the blade clean and oil.—*H. Mullen, Cleveland.*




## Wall anchors make tight handle grips

When tool handles become loosened after use, insert a wall anchor firmly into the hole. Either plastic or lead-and-fiber anchors of the right size work equally well. The handle opening will be reduced and the walls of the anchor will provide more friction to hold the tool snugly again.—*Michael Ligocki, Gary, Ind.*



Urheberrechtlich geschütztes Material

## New chain saw rides in a pocket

The big guy above is about to climb a tree to lop off a limb with a new compact and lightweight chain saw. The chain end of the saw fits easily into a deep pocket of his jeans.

The saw is one of two just announced by McCulloch Corp. Model MAC 1-10 weighs 10½ pounds and MAC 2-10 scales at 10¾ pounds, without chain or cutting bar. Both models feature idle control, iron-lined reborable cylinder, all-position carburetor. Each can handle 12″, 16″, 20″, or 24″ cutter bars. MAC 1-10 lists for $179.95, MAC 2-10 (for heavier work) for $199.95.

## Adapter fits nut sockets to screwdriver

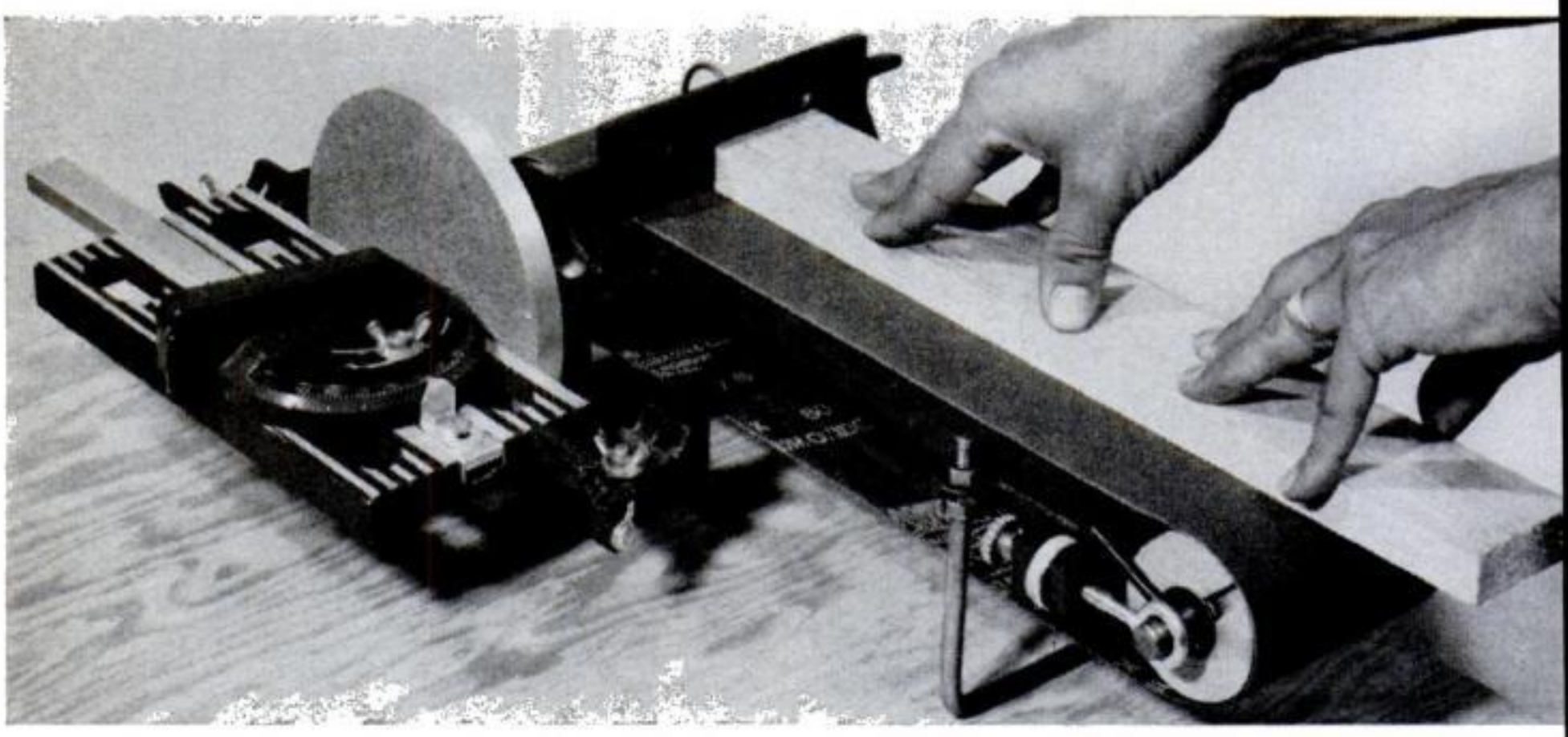
A series of three chuck adapters lets you turn a fast-working spiral-drive screwdriver like the one shown into a nut driver. Three shank diameters, 7/32″, 9/32″, and 5/16″, fit different size spiral hand drivers, and come with stubby nut drivers with ¼″, 5/16″, and ⅜″ hex openings. Xcelite Inc., Orchard Park, N.Y. is the maker.

## Point breaks off to give knife new edge

Instead of unscrewing and disassembling the handle of this new Stanley utility knife to put in a new blade, you simply extend the blade another notch, place the knife on the floor under your foot, and break off the dulled segment. Score marks cause the blade to break cleanly. The end that remains is razor-sharp. The blade can be retracted so you can carry the knife safely. The knife comes with two 10-point break-off blades (foreground at right) and two double-ended utility blades like the one lying between the two knives.

Urheberrechtlich geschütztes Material

# Personal-use report: 2 Shop Tools with



By Charles E. Rhine

IT'S hard to believe that you can buy a disk-belt sander or a wood-turning lathe for less than $30 and find it rugged and reliable enough to stand up under actual shop use. When we heard that the American Machine & Tool Co., Royersford, Pa., was putting out just such machines, we decided to get them and try them out.

At first look at the tools—if you're the type who loves to show off your workshop—you may not fully appreciate them. Both are devoid of any fancy features.

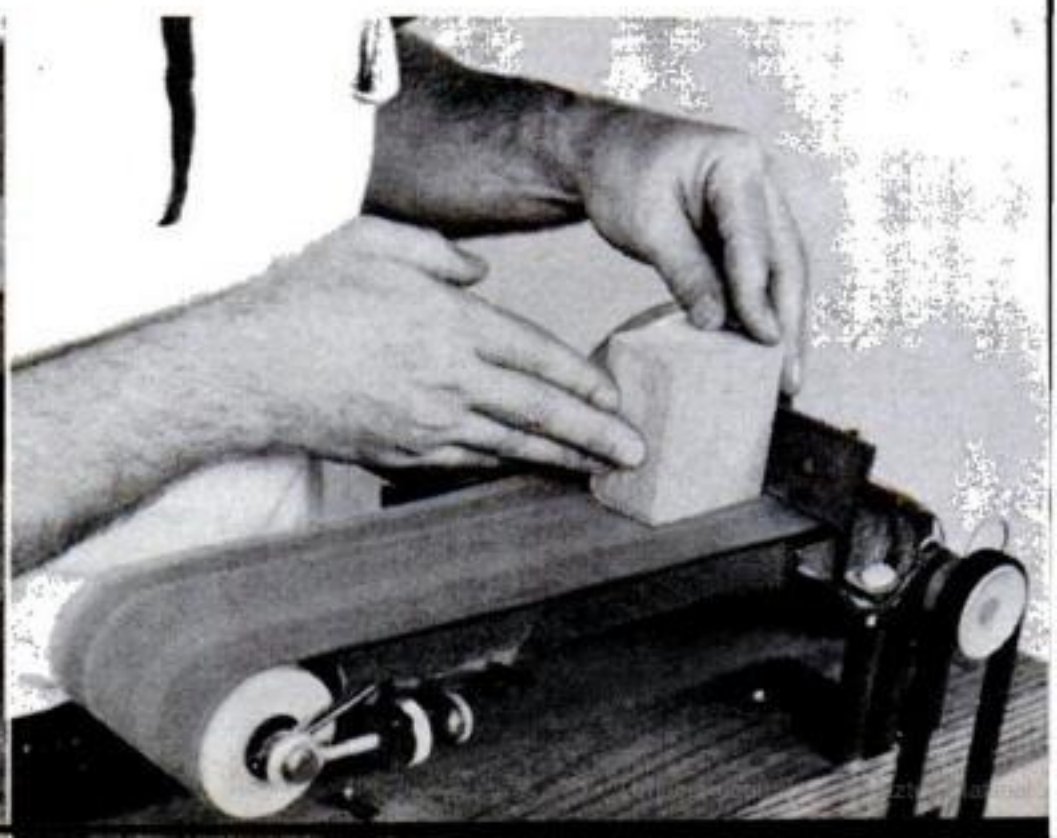
But inspect the components and you'll find sturdy cast-iron bases, oil-impregnated sintered-bronze bearings, and other husky steel parts. It would seem that the company is justified in giving the unconditional 10-year guarantee that comes with the machines.

***The combination belt and disk sander*** has a surprising number of good features. The belt unit can be raised up for vertical operation. The disk-sander table can be adjusted for sanding bevels and compound angles. The drive spindle will take an adapter to accept ¼"-shank accessory tools

## Use sander for disk and belt sanding, or as a power source

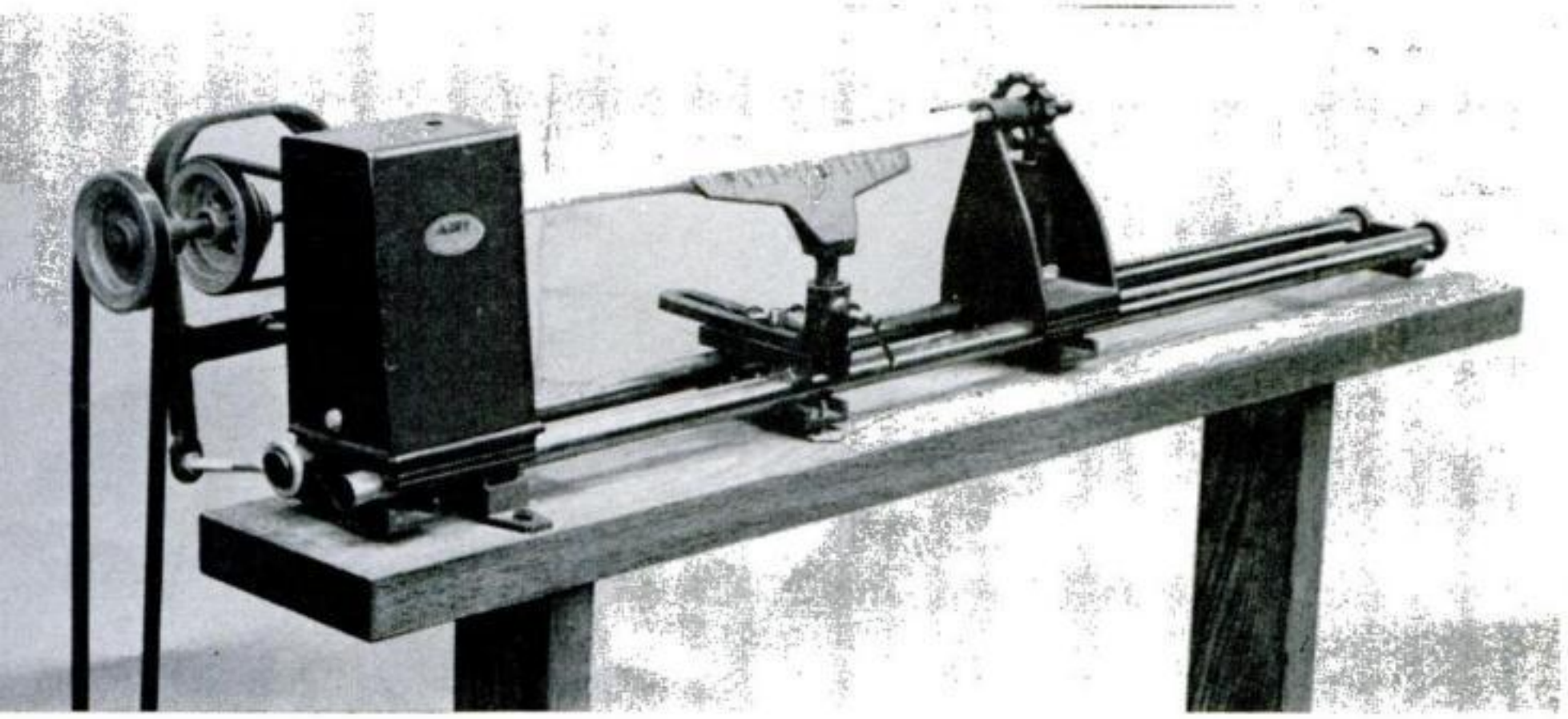
**Sanding disk** is 6" in diameter. The table comes equipped with a miter gauge, and is adjustable from a right angle to 45 degrees.

**Belt sander** takes a standard 4"-by-36" belt. It has a cast-iron table and hardwood rollers. The drive drum has a rubber sleeve.



# a Low Price Tag

PS TOOLS



such as a sanding drum, grinding wheel, wire brush, or rotary file.

It took a bit of work to get the sanding belt to track. Once set, it ran nicely on the crowned drums. Tracking and tension are adjusted by two eyebolts connected to the idler roller. It's a simple setup, and the uncomplicated design is probably one of the reasons for the unit's low price.

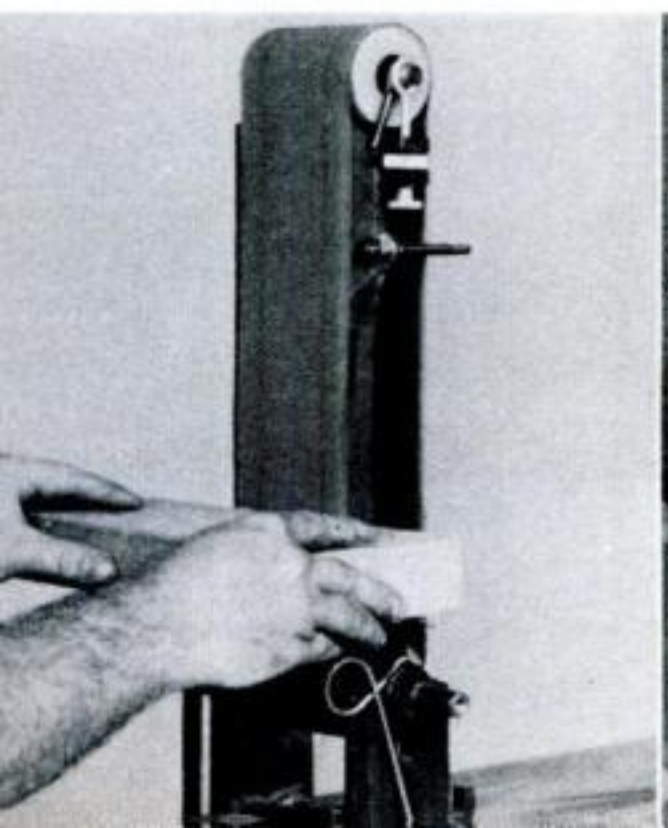
The disk sander with table and miter gauge is a valuable tool for sanding to exact size or angle. The scales on the miter gauge and the table are a little small for precise setting. But where great accuracy is needed, they can be set easily with a square and protractor.

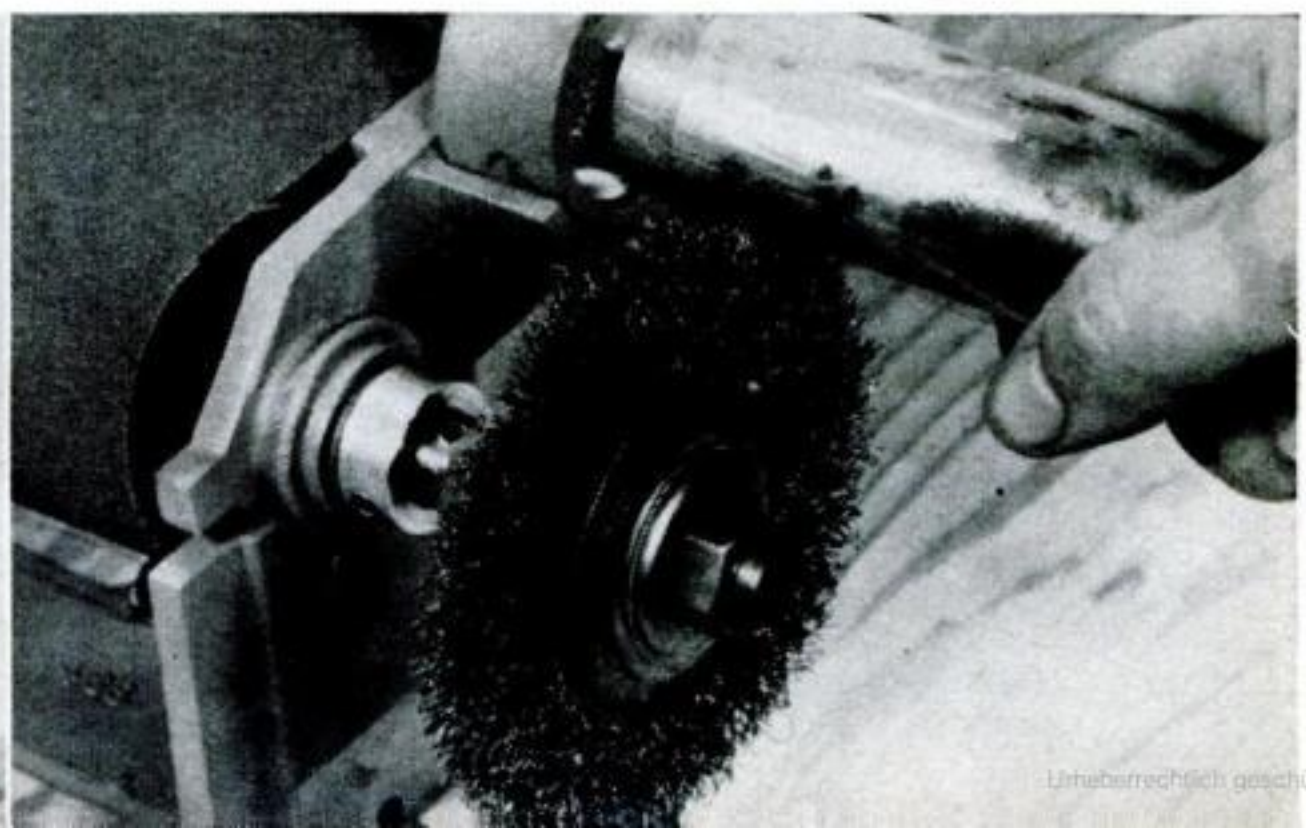
***The wood-turning lathe*** has a 12″ swing with 36″ between centers. It comes with a three-speed pulley, but is shown here with an optional countershaft for lowering speed for large-diameter turning. A foot on the tool-post base screws down against the bench top to eliminate most of the vibration when taking heavy cuts.

The nicest part about these two mail-order tools is that they let you build up a complete and versatile shop without laying out a lot of cash.

**Changeover** to vertical belt-sanding takes only seconds. Remove the V belt and two steel clips that hold the unit on the base. The belt sander can then be lifted out of the base casting and re-inserted in a vertical position.

**Power-takeoff drive spindle** will accept ¼″-shank accessory tools to permit drum sanding, grinding, buffing, wirebrushing, and rotary filing. It is run off the disk-sander drive spindle by removing the table and disk platen.





Urheberrechtlich geschütztes Material

PS TOOLS

# VARIABLE SPEED:

**First two-speed jigsaw** for the home shop is made by Rockwell. You can flip the handle switch to high speed for cutting wood, to low speed for metal, plastics, and tough materials.



Urheberrechtlich geschütztes Material

# The Big News in Tools

**Any speed** from zero to 2,250 r.p.m. can be obtained on this new Rockwell drill. It's available in both ¼" and ⅜" models. It also comes as a ¼" unit with two-speed trigger control.

**Finger pressure** on the trigger of this new Black & Decker drill controls the speed. Infinitely variable speed control is built into new ¼" and ⅜" drills made by the company.

TOOLS that shift speeds to suit the work are creating a lot of excitement in home workshops. Infinitely variable speeds, multiple speeds, and dual actions are now being built right into all sorts of portable power tools.

Two of the big power-tool makers, Rockwell and Black & Decker, have come out with a batch of new tools designed to give the range of speeds needed for a variety of jobs.

Four tools in Rockwell's "Green Line" have variable speeds: a two-speed jigsaw, ¼" and ⅜" drills with infinitely variable speeds, and a two-speed ¼" drill.

Black & Decker has come out with a two-speed belt sander, ¼" and ⅜" drills with infinitely variable speeds, and a dual-action sander that can be switched from orbital to straight-line operation.

***Squeeze for speed.*** It's fascinating to feel these new infinitely variable drills rev up as you gradually squeeze the trigger. You can start a drill at a crawl and slowly wind it up to top speed. With a little practice, you can squeeze off a speed that's just right for drilling metal, wood, plastic, or masonry. Or you can slow it down enough to use it as a power screwdriver. Run it at the right speed for the job, and you'll get greater accuracy, a smoother cut, and longer drill life.

The secret of this amazing control over drill speed is a clever little electronic device built into the handle. It's a silicon-controlled rectifier (SCR) of the type used in those speed-control boxes that can cost you anywhere from $10 to $30.

Both the ¼" and ⅜" Rockwell drills are variable from zero to 2,250 r.p.m. The ¼" Model 52 is $24.88, the ⅜" Model 56, $29.88.

The ¼" Black & Decker Model U-205 delivers speeds from zero to 2,250 r.p.m. and sells for $26.88. The ⅜" Model U-225 goes from zero to 1,000 r.p.m. and sells for $31.88.

CONTINUED



Urheberrechtlich geschütztes Material

**Two-speed belt sander** from Black & Decker can be set for fast stock removal or polishing and finishing. The motor is housed between the belt pulleys to give good balance.

**New dual-action sander** offered by Black & Decker can be switched to either orbital or straight-line action so that both heavy and finish sanding are done on one machine.

You can buy the ¼" unit in a kit ($31.88) that includes a steel carrying case and 27 accessories.

***Two speeds are better than one.*** Merely slowed down, some tools do a lot of jobs better. The tiny gadget that makes it possible to cut down the speed of a tool is a half-wave diode rectifier that changes AC to DC, but consequently passes only half power to the motor.

Rockwell's new jigsaw runs at 3,300 strokes per minute in high speed, which is right for cutting wood. Switch to slow speed and it runs at 2,500 strokes a minute, a good rate for sawing metals, plastics, and tough composition materials. The switch is in the top handle and handy to the fingertips.

**Three new drill kits** from Black & Decker: a 29-piece set (left) with ¼" variable-speed drill, and two 14-piece sets with regular-speed ¼" and ⅜" drills in plastic kit boxes.

The two-speed Model 61 jigsaw ($29.88) has a ⅜" stroke and a tilting base for cutting at angles up to 45 degrees. A built-in dust-blower and chip-deflector shield keeps the cutting line clear while keeping dust and chips out of your eyes.

Black & Decker's Model 840 two-speed belt sander runs at 1,700 sanding feet per minute for removing stock fast, and at 1,400 feet for finish sanding and polishing. The new sander has a low center of gravity for good balance and easy control. To get this, the motor and housing were sandwiched between the belt pulleys. The belt runs flush along one side of the machine for sanding right up to a vertical.

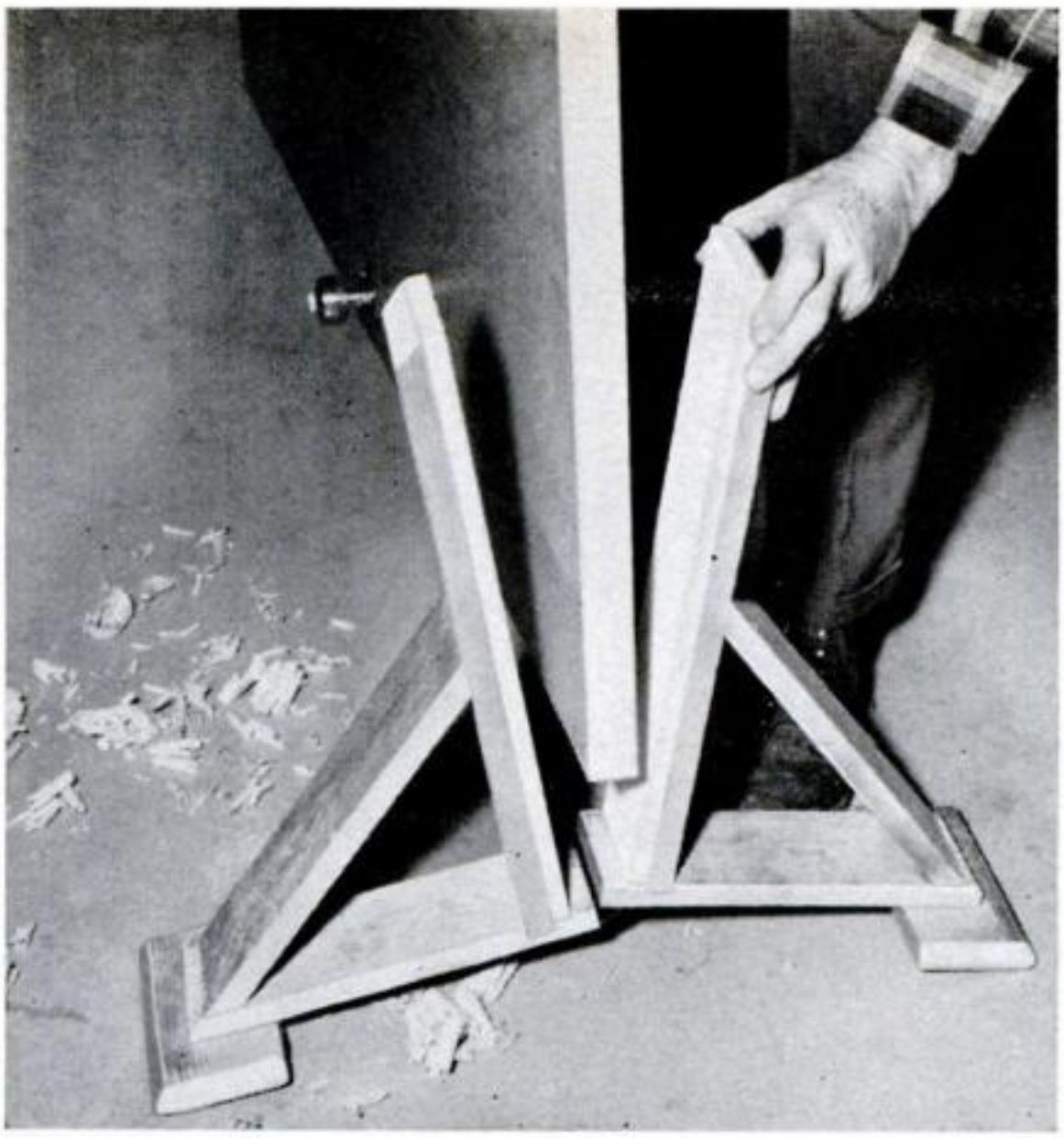
The sander sells for $110. It weighs 12 pounds and uses standard 3"-by-24" belts. It will also take Black & Decker's Lusterlon belt for polishing wood and metal.

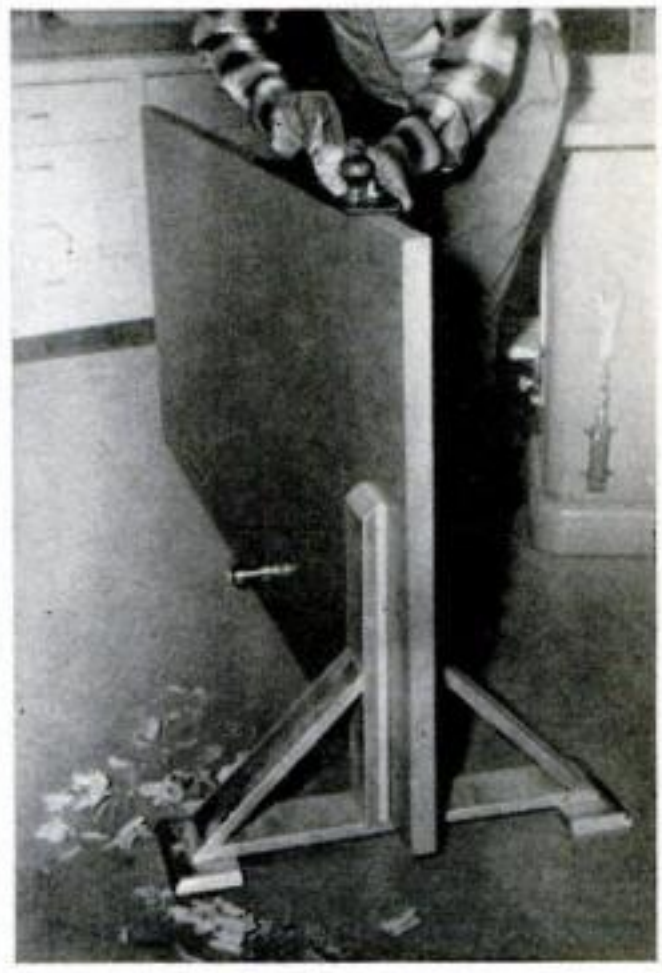
The two-speed drill in Rockwell's new line runs at the normal 2,250 r.p.m. for a ¼" drill. But pull the trigger only halfway back, and it turns over at only 1,300 r.p.m., a good average speed for a lot of drilling jobs in metal, plastics, and masonry. Price: $19.88.

***Getting in and out of orbit.*** Black & Decker's new Model U-240 dual-action sander ($31.88) can be switched from orbital to straight-line motion with a flip of a lever. Orbital action is used to remove material fast, straight-line motion for smooth finish sanding. It has a no-load speed of 4,000 orbits or strokes per minute. ■ ■



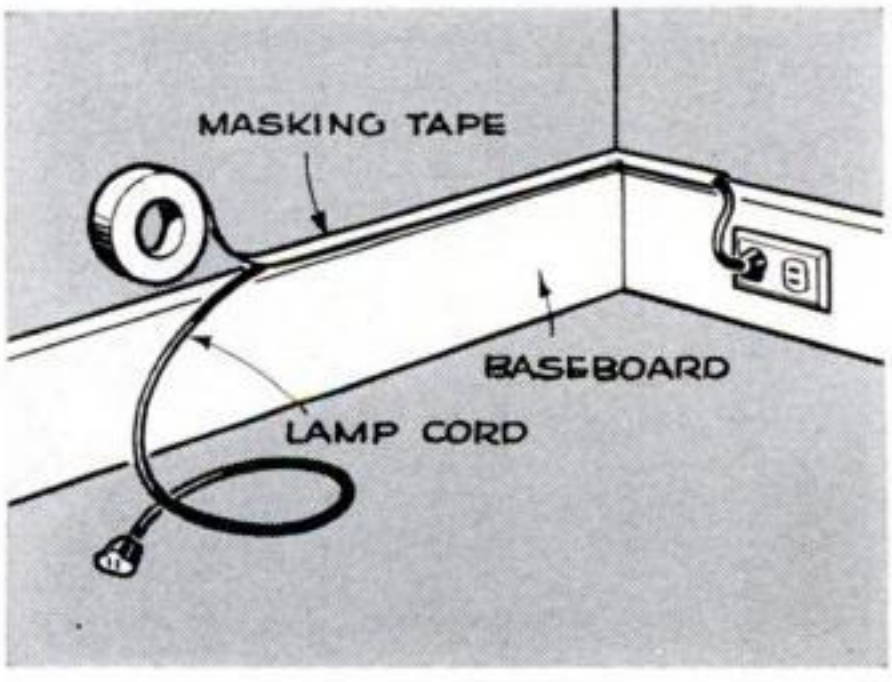
Urheberrechtlich geschütztes Material





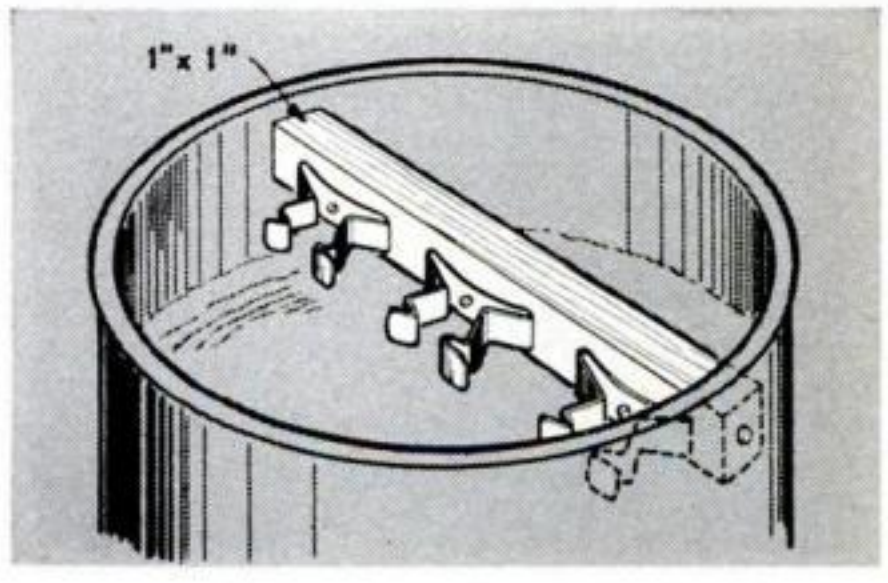
## Easy-to-make jack adjusts for door thickness

A leather strap 10″ long and 2½″ wide serves as a hinge between the two halves of this door jack. Nailed under the bottom wood pieces, the strap adjusts enough to take doors from 1⅜″ to 1¾″ thick. The spacing between the two vertical members must be just right so that the center of the jack doesn't touch the floor when in use. If the spacing is correct, the weight of the door provides clamping power. The one-by-four uprights are faced with a soft insulation material to prevent damage to the door and grip it better.—*Wayne M. Judy, International Falls, Minn.*




## Tape keeps cord snug on baseboard

If you must run a lamp cord to an outlet some distance away, the sketch shows how you can make it more shipshape—as well as safer. Cover the cord with masking tape on top of the baseboard and you'll hardly notice it's there.—*Ken Murray, Colon, Mich.*




## Broom holders store brushes in cleaner

The sketch shows how I made a paintbrush holder and cleaner from a clean one-gallon can, a one-by-one strip of wood, and spring clips of the type used to hold brooms and tools. Wood screws through the can hold the ends of the strip. The clips keep brushes from touching the bottom of the can.—*R. B. Ryan, Torrance, Calif.*



Urheberrechtlich geschütztes Material

# New Way to Insulate a Cold Basement

**You apply foamed plastic to the walls and put plasterboard over**

**1** **One-by-four furring strips** were nailed to base of wall to support gypsum wallboard used as the finish surface of the new wall. Dark area on the wall is waterproofing compound.

**2** **Adhesive** was applied in stripes with caulking gun to back of insulation panels. The adhesive (Barrett's 220) was designed especially to attach foam insulation to walls.

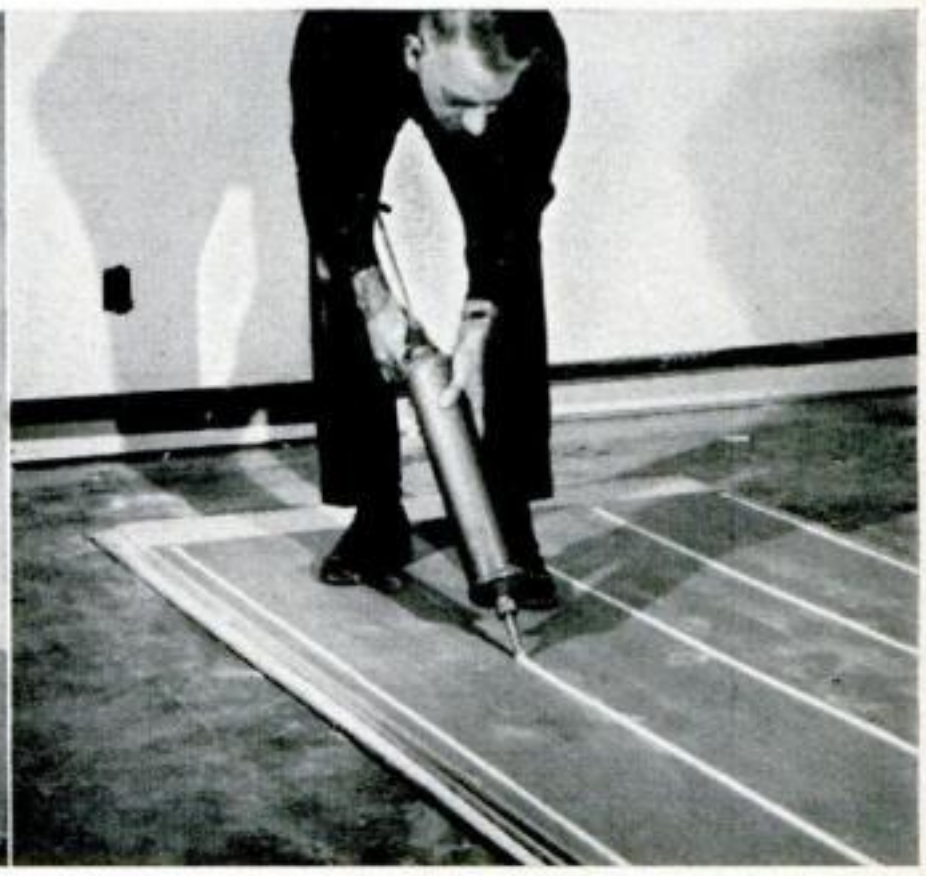
**5** **Gypsum wallboard** was placed over the ¾"-thick insulation and then nailed to furring strips to keep it in place. All the wallboard joints were taped and smoothed in the usual way.

**6** **Furring strips** were nailed to the ceiling in preparation for installing the tile. Exposed pipes along the ceiling were enclosed by building a furring-strip frame as shown.

**Urethane insulation,** a foamed plastic made in 3′-by-4′ panels, was the key material used in refinishing this basement. Objective was to make the room more livable—and warmer. A new partition with louvered doors was built to hide the heating plant (visible in photo at far left).

it, cementing both materials in place

**3** **Another furring strip** was nailed along top of 4′-high insulation panels and then more panels cemented above. The insulation is made by Barrett Div., Allied Chemical Corp.



**4** **Special adhesive** was also applied to back of gypsum wallboard. Adhesive is waterproof and white. After 24 hours it sets up into a bond that the maker says can't be broken.

**7** **A good trick to remember** is shown here. If the ceiling is uneven, and many are, you can use thin slivers of wood to shim out furring strips. Stretched cord serves as a leveling guide.

**8** **Tiles were stapled** to strips to complete the ceiling. Driven through tongue of tile, staples are covered by next tile. Stapler is easier to use for this job than a hammer would be.

Urheberrechtlich geschütztes Material

# Popular Science AWARD

*Fisher Body Division general manager Robert H. Gathman (left) and PS publisher John R. Whiting congratulate $5,000 scholarship winners Geza A. Loczi (holding white model) and Dwight Conger.*

Popular Science Monthly announces another in its series of Awards introduced to give recognition to companies and individuals making outstanding contributions to American living in fields of interest to PS readers. The sixth selection of the Popular Science Editorial Board is the:

## Fisher Body Craftsman's Guild

Organized to help fill tomorrow's needs for skilled manpower, the Fisher Body Craftsman's Guild has been one of the nation's foremost developers of talented youngsters. Its more than 8,000,000 alumni have set a high standard of excellence in the field of automobile styling and in nearly every other professional and business activity. The Fisher Body Craftsman's Guild is a fitting winner of the Popular Science Award because it has consistently emphasized the value of craftsmanship and beauty in the things we use.

Ernest V. Heyn
Editor-in-Chief

John R. Whiting
Publisher

**Finalists at Craftsman's Guild Convention** inspect some of 1,200 models submitted to judges. Boy in center holds winning entry. For a close

# Model Dream

## By Herbert Shuldiner

DESIGNS for cars of the future are taking shape all over the country right now. The talented hands of thousands of youngsters are modeling bits of wood and plastic into dream cars. Their target: a share in the prizes awarded in the nation's biggest youth contest, the Fisher Body Craftsman's Guild competition.

Past performance indicates the lucky model builders will also be building a shiny future in one of the most exclusive and best-paying professions in the world.

The contest has been the takeoff point for many top designers. Craftsman's Guild alumni make up over half of the General Motors design staff. Many others hold important styling positions with Ford, Chrysler, and American Motors—as well as leading independent design studios.

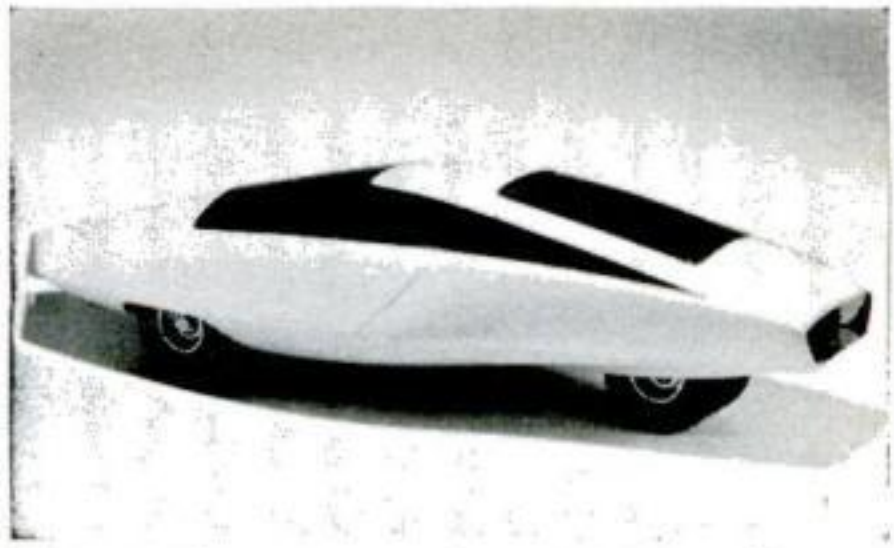
"Also-rans," contestants who didn't finish in the money, have frequently done well,

CONTINUED

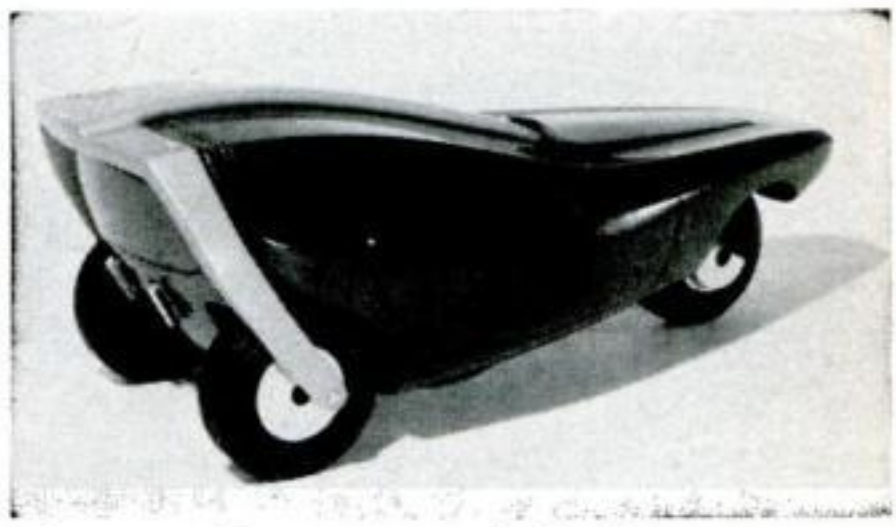


Urheberrechtlich geschütztes Material

look, see photo at upper right. Most of this year's entries reflected current trends toward wedge shape and one-color paint jobs.

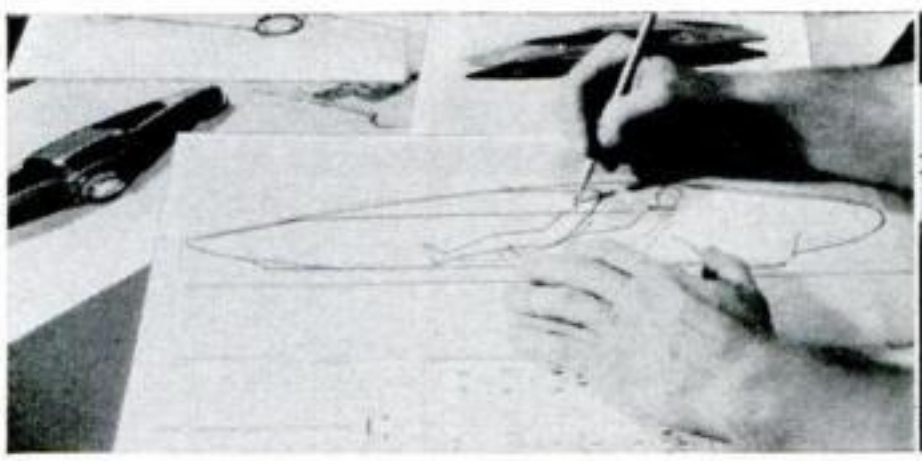


**His seventh entry** won Geza A. Loczi of Scottsdale, Ariz., this year's top prize. Model has wide-track front, narrow track in rear.

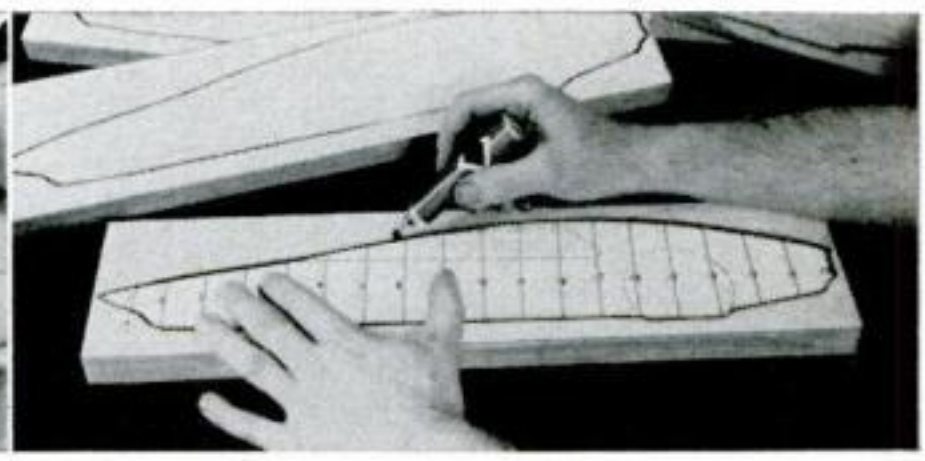


**Also-rans** like Paul Meeker's "commuter vehicle" are interesting, too. Body is suspended from frame and "powered" by Wankel engine.

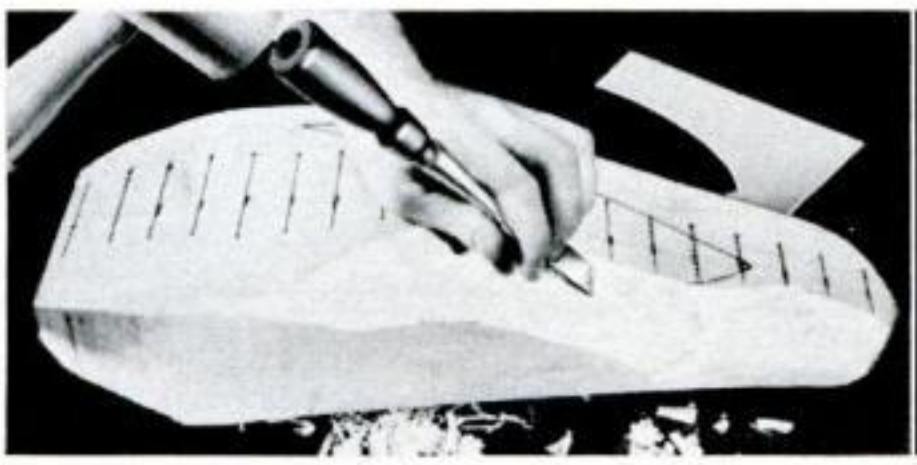
# Cars Build Dream Careers



**1. How a model is made,** step by step. Design is worked out on paper before carving begins.



**2. Cardboard template** of design is used to outline wood sections that will be laminated.



**3. Laminated wood is cut** with coping saw, and a mallet and chisel are used to sculpt station lines.

**4. Windows, doors, and other lines** are scored into final model with a small knife or jeweler's file.



Urheberrechtlich geschütztes Material

**Inspecting models** at exhibit in Fisher Body auditorium are William L. Mitchell and Charles M. Jordan, General Motors styling executives.

too, winning jobs on top styling staffs when their models caught the eye of employers.

Over eight million kids have enrolled in the Craftsman's Guild since 1930. It's open to boys 11 to 20 years old who design and build 1/12-scale model cars in the hope of winning one of the 1,078 prizes, worth $117,000, given every year. Nearly $2½ million has been given away since the first youngster picked up his winnings.

Contestants are judged for originality as well as craftsmanship. A very original designer may not be good at carving or painting—and thus lose out in overall judging—but still impress with his styling.

Guild competition alumni have also rung up a remarkable record in many professional fields other than industrial design. Even though many boys fail to complete their models, participating in the Craftsman's Guild program provides them with valuable experience. A remarkable 90 percent have earned, or are studying for, a college degree. Among Guild alumni are big-industry executives and top-flight professionals, including the inventor of an artificial heart and a flight-test engineer on the X-15.

One big reason for this is that the Guild promotes the exacting standards of old-fashioned craftsmanship while encouraging forward-looking, tradition-breaking design.

When the contest was inaugurated in 1930, craftsmanship was most important, and the awards were made for the finest models of a Napoleonic coach—the symbol of the Fisher Body Division of General Motors. Later, the contest was broadened to include the design of sedan cars, and eventually coach modeling was dropped.

***Freedom to dream.*** Then came open competition. In 1963, the young designers could enter model station wagons, sports cars, convertibles—even cars that were asymmetrical, with unconventional wheel arrangements.

All this freedom doubled the challenge and made the contest more popular than ever. Over 600,000 youths have enrolled each year for the last several years. And more than 1,200 models were received for the latest contest, which ended in July.

C. W. McClellan, the genial director of the Craftsman's Guild, showed me the models while they were being judged at the Fisher Body headquarters in Warren, Mich.

Most of the miniature vehicles give the feeling of movement even when they are standing still—just as most modern cars do. The wedge-shape design predominates.

I was surprised to find that, although they

[*Continued on page 211*]

**Asymmetrical model** was built by Dennis Little. Windshield swings up and down, and tops of seats swing out, so passengers can get in and out.

**Model with close-set rear wheels,** built by Albert W. Brown, is designed to carry an atomic power plant with a five-year fuel supply.

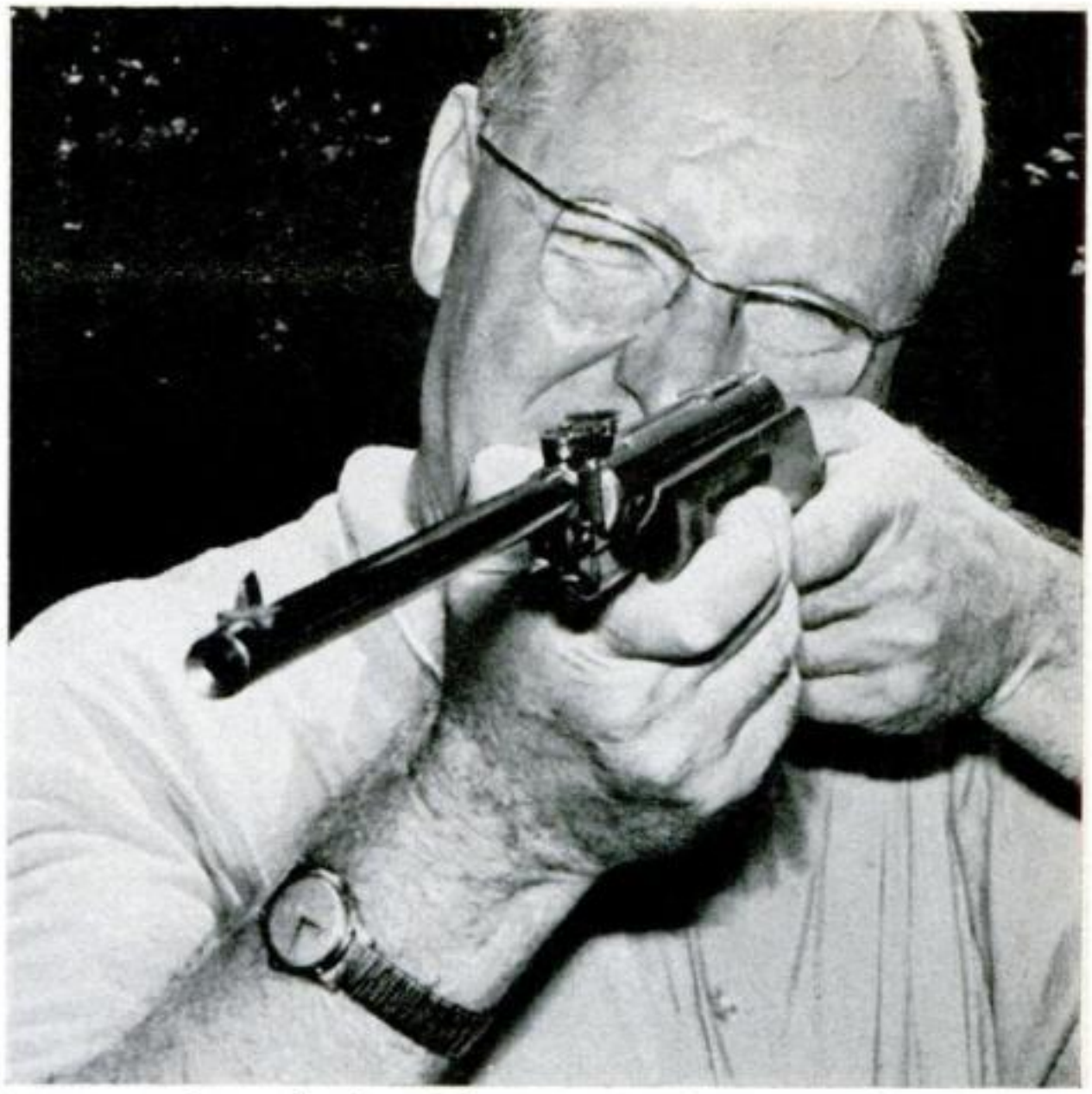


Urheberrechtlich geschütztes Material

# Now— a Bullet Without a Case

## Heat from compressed air sets off new propellant behind a piece of lead

**By Hank Bradshaw**



**Prototype of gun** developed by Daisy for the new caseless bullets is fired (left-handed) by Jules Van Langenhoven, inventor of system.

AN EXCITING new shooting system pioneered by the Daisy Air Rifle Co., Rogers, Ark., will introduce the first big change in small-arms ammunition since self-contained cartridges were patented in 1812.

The system consists of a .22-short slug with a wad of chemical propellant about ¼" long stuck to the rear, and a special spring-fired rifle. Daisy will market them about January 1.

***The ammo.*** Velocity of the bullet can be varied by varying the propellant. Initially, Daisy will offer two bullets. One with a velocity of 700 feet per second. is designed to pack a greater wallop than the usual top of 400 to 600 f.p.s. obtained from $CO_2$ or pneumatic guns. The other, a 1,150-f.p.s. bullet, is faster than a regular .22 short.

The system may eventually extend to shotguns, handguns, high-powered rifles—even military weapons. The propellant also holds promise for powder-actuated tools. In guns, Daisy engineers have tested the propellant at a muzzle velocity of 3,000 f.p.s.—faster than some big-game rifles.

The caseless bullets are firm in the gun, but the propellant is so soft that a fingernail can crumble it off the bullet. When triggered, the propellant oxidizes so completely that only a trace of residue remains. The prototype gun has been fired 50,000 times without being cleaned.

***The special gun.*** A lever-action repeater with rifled barrel, the gun uses compressed air like a BB gun. The energy comes from a spring.

Cocking the spring pumps air into the firing chamber. When the trigger is pulled, compression heats the air, igniting the propellant. I noticed no recoil.

The gun holds about 40 rounds. It will sell for less than $25, the bullets for less than .22 shorts.

**New caseless bullet** is pictured at the right along with a standard .22 long and a .22 short.



Urheberrechtlich geschütztes Material

# Gus Runs Into

Gus picks up some business the hard way when his tow truck tangles with a runaway car

**By Martin Bunn**

ROLLING his tow truck toward the nearest turnaround exit on the parkway after answering a road call, Gus Wilson sniffed the pine-scented fall air with relish. He'd get back to the Model Garage by closing time.

If Gus hadn't been in the habit of watching oncoming cars, as well as those around him, he might never have returned to his shop at all. Just as he entered a curve, a big Chrysler convertible started a pass on the opposite side. It veered left abruptly to get around a car—and kept veering. The instant its front wheel crossed the dividerless center line, Gus knew he was in for trouble.

He swung onto the shoulder. The big convertible seemed bent on meeting him head-on. It grew in the windshield as if seen through a zoom lens; Gus could see the driver fighting the wheel. The Chrysler sped past so closely Gus could have touched it. The tow truck shuddered as metal bit metal in a glancing blow. Gus came to a controlled stop on the grass. In his mirror he saw the car pull up behind him, perhaps 75 feet away.

For half a minute Gus sat still. Then, getting out on unwilling legs, he went back to the Chrysler, a '55 model. Its bumper was caved in where it had struck the wrecker. Hunched motionless over the wheel sat the driver, his left hand clenched.

"You okay, or need help?" asked Gus.

The head lifted. A young man of about 20 looked up.

"Of all the blasted, rotten, dirty luck!" he said bitterly.

"Are you hurt?" repeated Gus.

The other shook his head.

"Then quit beefing," snapped Gus. "We're lucky to be around and talking."

"I know. But I swore I'd meet my girl by six. Now our date is ruined."

"Let's look at your papers," said Gus.

He exchanged his with the young man, whose name appeared as David Blake. Gus made a sketch of the highway, with the paths of the two cars, and noted the damage to his truck, which had suffered only a dent.

"What made you cross over?" Gus asked.

Blake's answer was cut off by the arrival of a police car.

"Anybody hurt?" asked the patrolman who came up. "No? What happened?"

Gus told him.

"Now can I go?" asked Blake.

"Maybe you can go—after I see your li-



Urheberrechtlich geschütztes Material

# an Odd Customer

*The big convertible grew in the windshield as if seen through a zoom lens; Gus could see the driver fighting the wheel.*

cense. And give you a summons for crossing the center line," said the patrolman. "Why did you do it?"

"I was passing this other car," said Blake glibly. "It began to edge over . . ." Catching the officer's hard eyes, he flushed. "My power steering cut out," he concluded.

The officer wrote on a form.

"It's true!" insisted Blake. "You can ask *him* to check it right now," he added with a nod toward Gus, and opened the hood.

Gus looked at the belt that drove the generator and power-steering pump. The belt was intact. He walked around for a closer look at the pump.

The driving member of a three-part coupling that drove the pump was broken. Part of its hub was still on the rear of the generator shaft, but the driving lugs had snapped off. Gus reached down and picked a fragment of one off the oil pan.

"How about it?" asked the officer.

"Hydraulic steering power sure was gone," agreed Gus. "But he should still have been able to steer manually."

"Yeah? You try it," jeered Blake. "It feels like a 10-ton truck. Caught me just as I was lighting a cigarette, too."

The patrolman checked the annual inspection sticker, gave Blake a green slip.

CONTINUED



Urheberrechtlich geschütztes Material

"Be in court Tuesday the tenth, Mr. Blake. You'll hear if we need you, Mr. Wilson. Can this car be driven away, or should it be towed?"

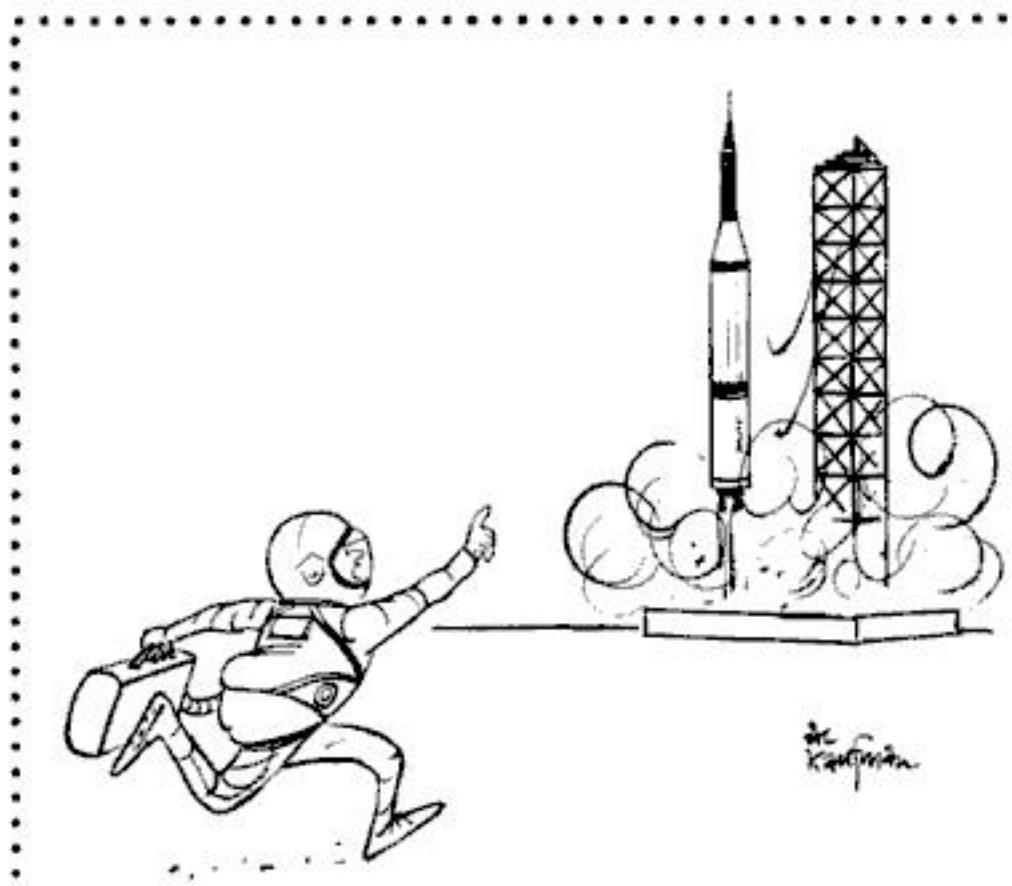
"I'll take a tow," said Blake.

***With the Chrysler on the hook*** and Blake beside him, Gus drove off at the next exit.

"How many of those pump couplings have you snapped?" he asked casually.

"Four. How'd you know?"

"You knew just where to look, so I figured that it must have happened before."



"Sure has, and it's driving me nuts. The first time it took me three days to find that part. Next time I ordered three from an agency. The last of those just went. My dad told me if it happened again I'd have to get rid of the car. I sure don't want to. Can you get me that part?"

"Maybe, but if four didn't help, it's time somebody found out why they break. The reason could be a broken seal ring, a stuck valve, or bent steering linkage. I'll check it through."

"Great," agreed Blake. "I'll be over in the morning. Could you let me off at Drake Avenue? I promised my girl I'd look over a used car she's thinking of buying. If she does, we'll have wheels for our date."

Gus went a couple of blocks out of his way to let the young man out at the corner of Drake Avenue. As he hurried toward a nearby house, an elderly man and a girl walked around a car in the driveway. It seemed to Gus, as he got his tow under way, that the car was familiar—and that the man was Silas Barnstable.

Gus drove on. The afternoon's events had been disturbing enough; he had no desire to run into Barnstable, his grouchiest—and stingiest—customer.

***First thing next morning,*** Gus put the big convertible on a body lift. In sharp contrast to its well-groomed exterior, the underside of the car bespoke serious neglect. Grease fittings were invisible under long-accumulated dirt.

Pulling out the cotter pin at the left end of the tie rod, Gus removed the nut and drove the rod out of its socket. With the left wheel disconnected, he was able to swing it from side to side.

Behind him, Gus heard a car drive into the shop. He was neither pleased nor unduly surprised to see Barnstable and young Blake get out of the 1956 Ford sedan he'd spotted in the driveway the night before.

"Hi, Mr. Wilson," said Blake. "Expect to find my pump trouble way down there?"

"Morning," replied Gus. "Yes, I do."

Having loosened the right end of the tie rod, Gus drove it out also. Then he grasped the right wheel and tried to swing it on the kingpin. Failing, he exerted all his strength. The wheel didn't budge.

"Here," he said, offering Blake a couple of clean rags. "You try it."

The young man took the rags and tried to move the wheel. "Sure is stuck, isn't it?"

"That's what broke the pump couplings," said Gus. "The kingpin is seized." He wiped off the grease fitting and applied a pressure gun.

"It's seized so hard I can't get any grease in. We'll have to take it apart, see whether rebushing is necessary, and fit a new kingpin. We'd better check and lubricate all other fittings, too. They look as if they hadn't been touched in years."

"Guess they haven't," confessed Blake.

Gus shook his head. "This is something to watch if you have power steering. With manual steering, you'd have noticed it was getting to be almost impossible to turn the



CONTINUED

Urheberrecht ch geschütztes Mate al

# Handi-Van has 7 great features. But you need remember only one.

**This is what we want you to remember.
Handi-Van is made, sold
and serviced by truck people.
GMC truck people.
Yet Handi-Van's price is low.
Right down with the others.**

GMC gave Handi-Van 211 cu. ft. of inside space. You can pile over one ton payload in there.

GMC put a 6-cylinder, 120 h.p. engine in Handi-Van. You can specify another engine. A 140 h.p. heavy duty workhorse. Both care little for gas but care a lot about your economy.

GMC engineered a 38-ft. turning radius into Handi-Van. Helps you scoot out of tightly packed traffic. Lets you deliver your goods when you said you would.

GMC toughened Handi-Van's loading area with a metal floor. Rugged construction like this saves money. Add this to low initial price and economical operation and you have a van that will be helping you make money every year you own it.

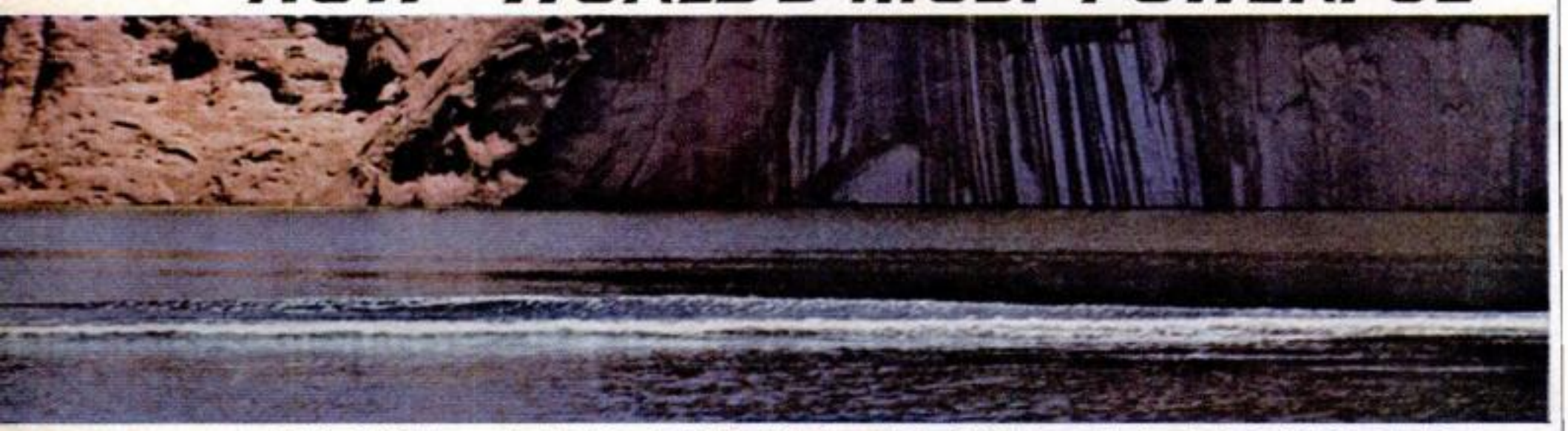
GMC makes it easy to get to the engine for routine maintenance. The cover over the engine lifts off, revealing all the vital parts.

GMC placed two big back doors on Handi-Van. And you can specify two side doors. Loading Handi-Van is a breeze. Owning Handi-Van is also a refreshing breeze. It cools off boiling budgets.

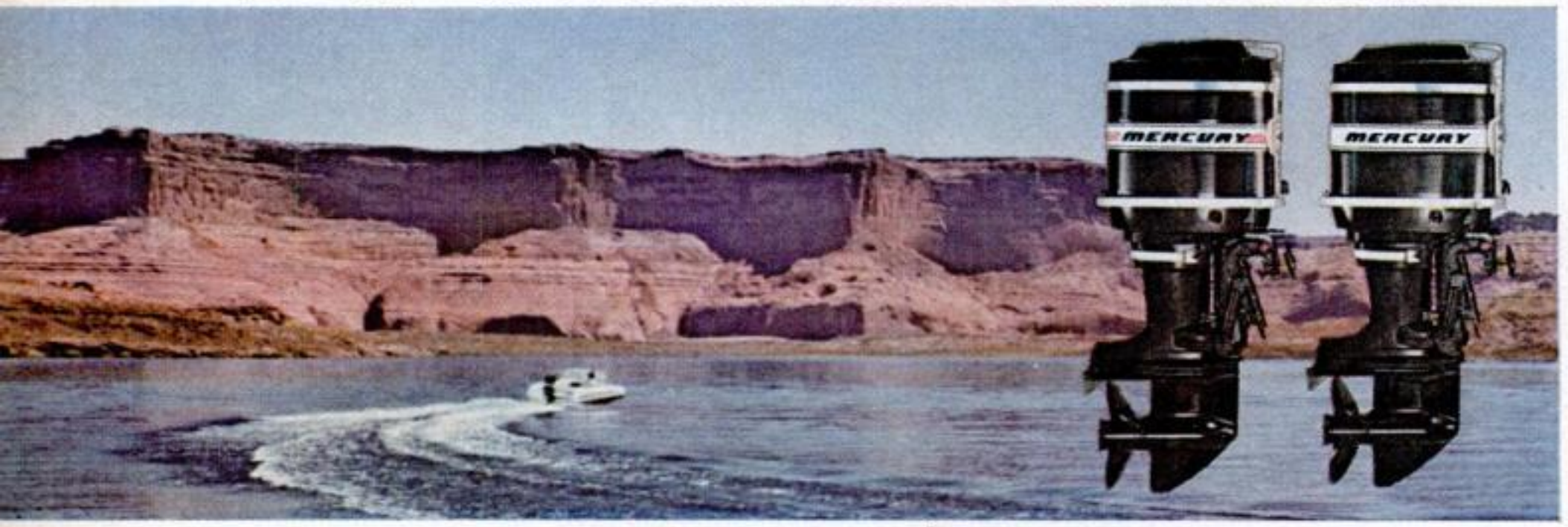
GMC
GENERAL MOTORS CORPORATION
TRUCKS
FROM ½ TO 60 TONS

Urheberrechtlich geschütztes Material

# NOW—WORLD'S MOST POWERFUL



# NOW—ALL NINE NEW MERCURYS




## see all the QUIET new '66 Mercurys —

From the pioneer in competition-proved high-horsepower outboards comes a new champion—the new 110-hp Merc 1100! What's it like to ride herd on 110 horses? Point the bow at the farthest point on the lake, crack the throttle—and that lake's suddenly smaller! The Merc 1100 is the great new successor to the Merc 1000—holder of more international performance and endurance records than any other outboard ever built!

From the sleek new Merc 1100—and the exciting new 95-hp Merc 950—all the way down the line to the trim 3.9-hp Merc 39, these new Mercs are quiet—*quietest outboards you can buy!*

Also new for '66: now you can safely use a 50:1 gasoline-oil ratio with our new *Formula 50* Super Outboard Motor Oil. New *Polar-Gap* spark plugs on both 6-cylinder Mercs cut fuel consumption, last more than

Urheberrechtlich geschütztes Material

# OUTBOARD—NEW MERC 1100...110 HP

# (110 TO 3.9 HP) ARE QUIET

## at your Mercury dealer!

twice as long as ordinary plugs, even on leaded fuel. Two new powerheads, three other models redesigned from top to prop—and much, much more.

Mercurys are designed by the industry's top engineers . . . then boat-tested under "customer environment" conditions around the clock and around the calendar at Mercury's Lake X. Result: Mercury '66—finest outboards ever built: 3.9, 6, 9.8, 20, 35, 50, 65, 95 and 110 hp. See your Mercury dealer!

Kiekhaefer Corporation, Fond du Lac, Wisconsin, and Toronto. Subsidiary of Brunswick Corporation.

LEAN AND RUGGED

KIEKHAEFER MERCURY

FIRST IN MARINE PROPULSION

MERCURY '66

Urheberrechtlich geschütztes Material

GENERAL MOTORS Futurama
NEW YORK WORLDS FAIR

**This is a GM Original:**
**It's vital to stopping safely.**

**This is a GM Replacement:**
**It does the same important job.**

Why? Because a GM Replacement Part is the same as a GM Original Part.

So when it comes to a job as vital as the one your brake master cylinder piston does, doesn't it make good sense to replace it with a part just like it? And doesn't it make sense to replace a genuine GM part with a genuine GM part for *any* important job?

Wherever you take your car or truck for service take it where you know they use Genuine General Motors Parts. You can recognize them by their GM and United Delco packages.

# GENUINE GENERAL MOTORS PARTS

GM CHEVROLET · PONTIAC · OLDSMOBILE · BUICK · CADILLAC · GMC TRUCKS United Delco

Urheberrechtlich geschütztes Material

wheel. But with power doing the hard work, you never felt it.

"On quick turns, the sudden overload would break the pump coupling. Then you couldn't steer. It nearly killed you yesterday. How come you take such good care of the car topside, and forget lubrication?"

Blake shrugged. "Greasing costs money. Cleaning and waxing I do myself."

"Quit chewin' the fat, Gus," put in Barnstable, "and fix them brakes you relined. I sold the car to this young feller's girl. They already had an accident in it."

"Not much of one," Blake said. "Last night Betty came up behind a car at a stoplight. She braked in plenty of time, but the car kept on and bumped the other one. When I tried it, the brakes held okay. But we told Mr. Barnstable whatever's wrong has to be taken care of."

With Blake beside him, Gus drove the Ford out. Six times the brakes held. The seventh time, they seemed weak. Gus nudged the automatic drive into neutral. The car stopped easily, engine racing. After a jab at the gas pedal, it idled again.

"It isn't the brakes." Gus told Blake. "The throttle's sticking."

***Back at the garage,*** Gus asked Stan Hicks, his helper, to check the throttle linkage. Barnstable was in the phone booth.

Stan came up to Gus shortly after. "You sure the throttle's hanging up, Boss?" he asked. "I took off the air cleaner and checked the linkage. It doesn't stick."

Going over to the Ford, Gus worked the linkage by hand. As Stan said, it operated the throttle faultlessly. But then, with the air cleaner off, Gus noticed something odd about the two-barrel carburetor.

"Don't you try making yourself another job," growled Barnstable as he came up.

"Look at this, Silas," said Gus. "See how the carburetor flange tilts back?"

Putting the air cleaner back on, Gus again tried the throttle linkage. Only a hard push would open it, and it failed to return to the idle position.

"See where it rubs the bottom of the air cleaner?" asked Gus. "When the engine's running, vibration sometimes frees it, sometimes doesn't. You knew the throttle was sticking, and, because the linkage is hidden behind the air cleaner, you took that off to see where. Only then it didn't stick. So you complained about the brakes, hoping to get two jobs for the price of one."

Scratching a mark on the air cleaner, Gus removed it and made a small dent at the mark. When he put the air cleaner back, the linkage worked smoothly.

"Never told you to fix that," muttered Barnstable. "I ain't payin' for it."

"Will you pay if I tell you what you did—something nobody else knows about—that caused the trouble?"

"You'll have to prove it!"

"Okay. You buy motor oil in bulk. Last time you put some in this car, you laid the oil-filler cap on the air cleaner. But you forgot, and slammed the hood on it. That shoved the cleaner down so hard it bent down the carburetor."

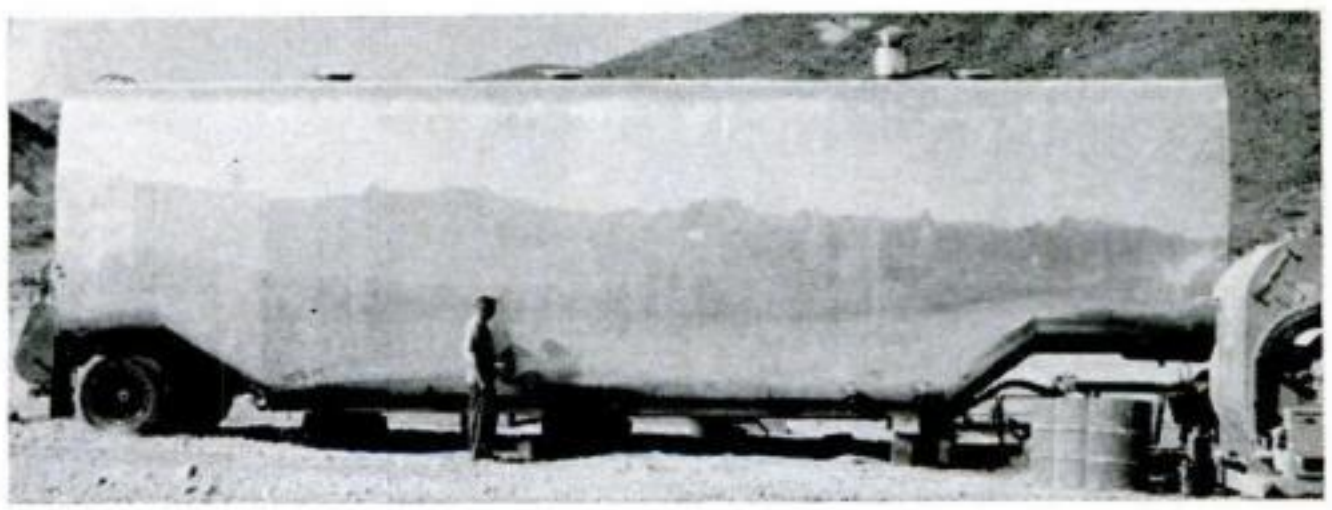
"Yeah? Prove it," growled Silas.

Gus pointed to the top of the air cleaner. "There's the dent made by the oil cap. And here's your bill."

***"He'd never have paid, Boss,"*** said Stan after Blake had driven out the Ford, "if you hadn't spotted that dent. I sure didn't."

"You weren't looking for it," returned Gus. "And Silas was too mad to look. He was too hurt by the dent in his pocketbook." ■■

## Big portable tank stores oil on job



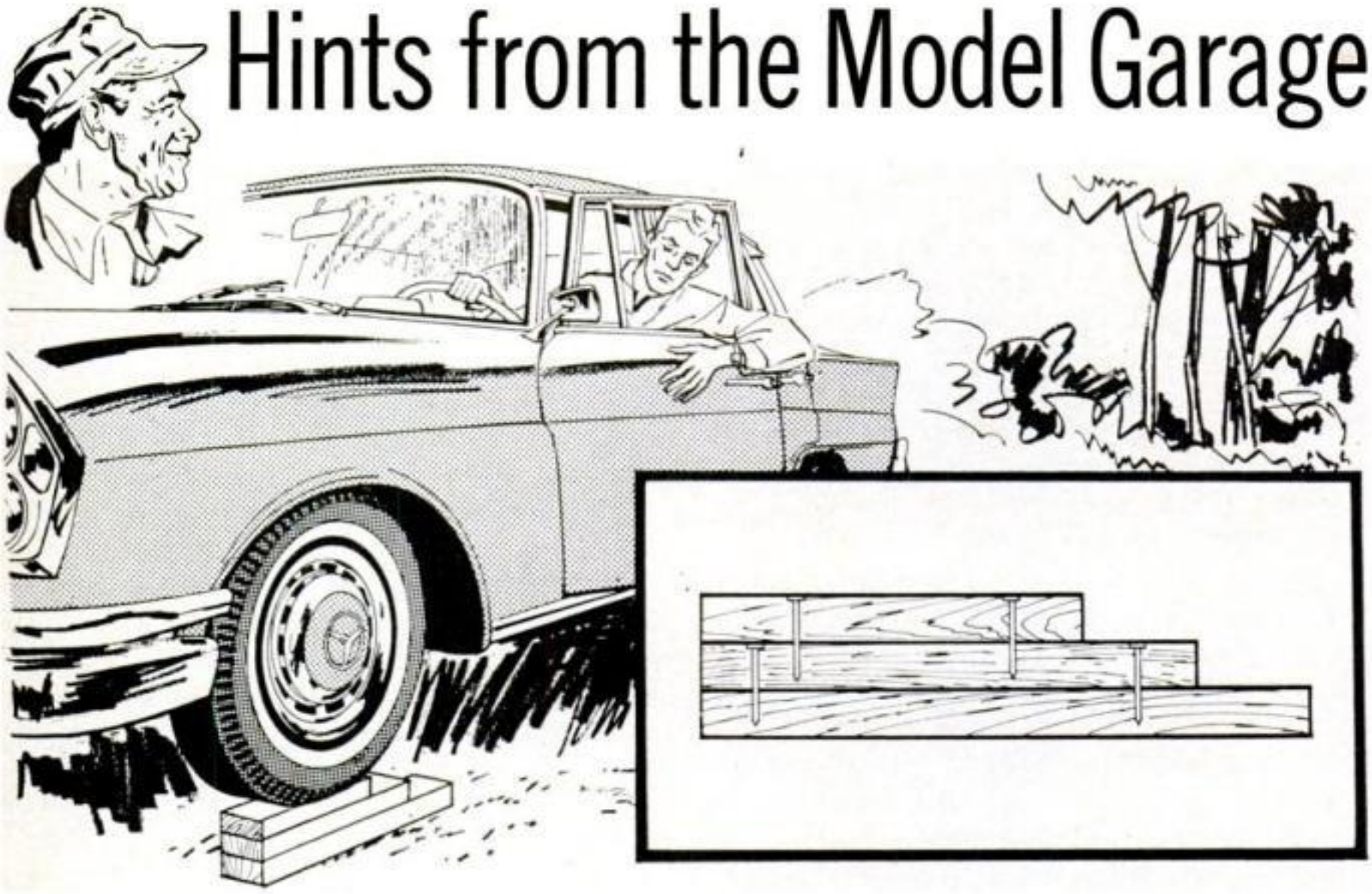
This huge trailer tank was built for a California highway-construction firm to carry 32,500 gallons of road-surfacing oil.

It accompanies crews building a section of new freeway across the Mojave Desert, providing them with an almost endless supply on the job. Thermostatically controlled panels divide it into compartments.

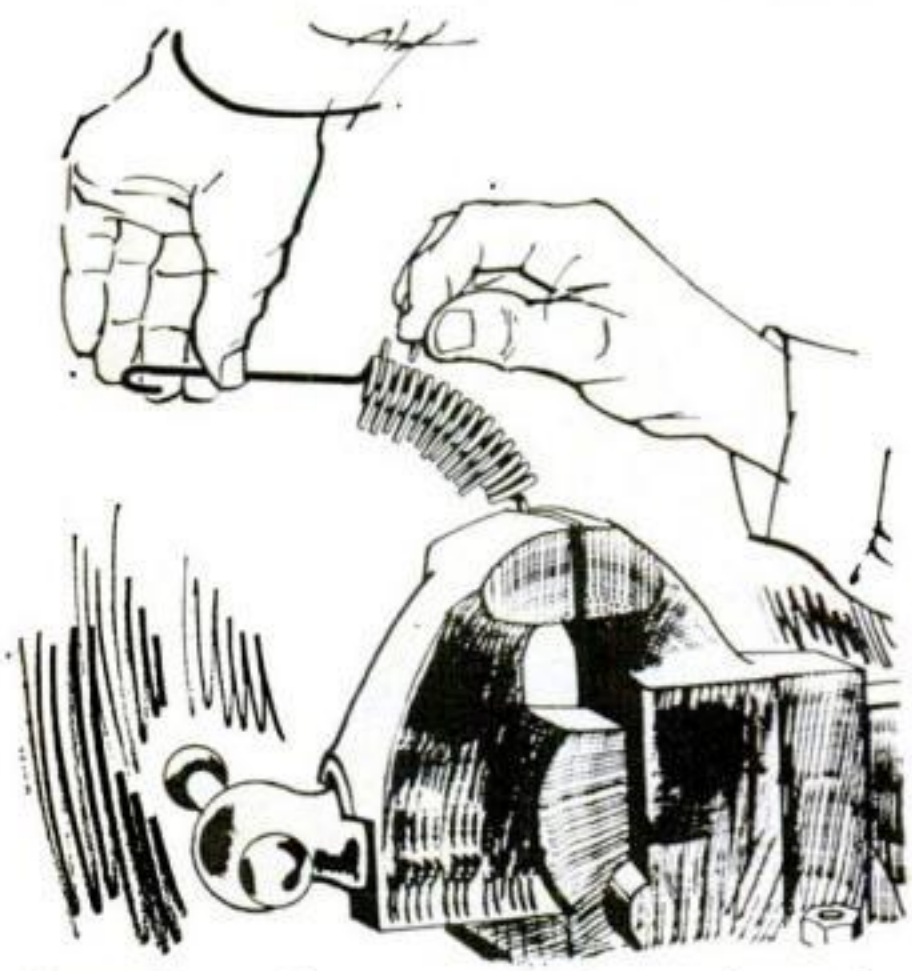


Urheberrechtlich geschütztes Material

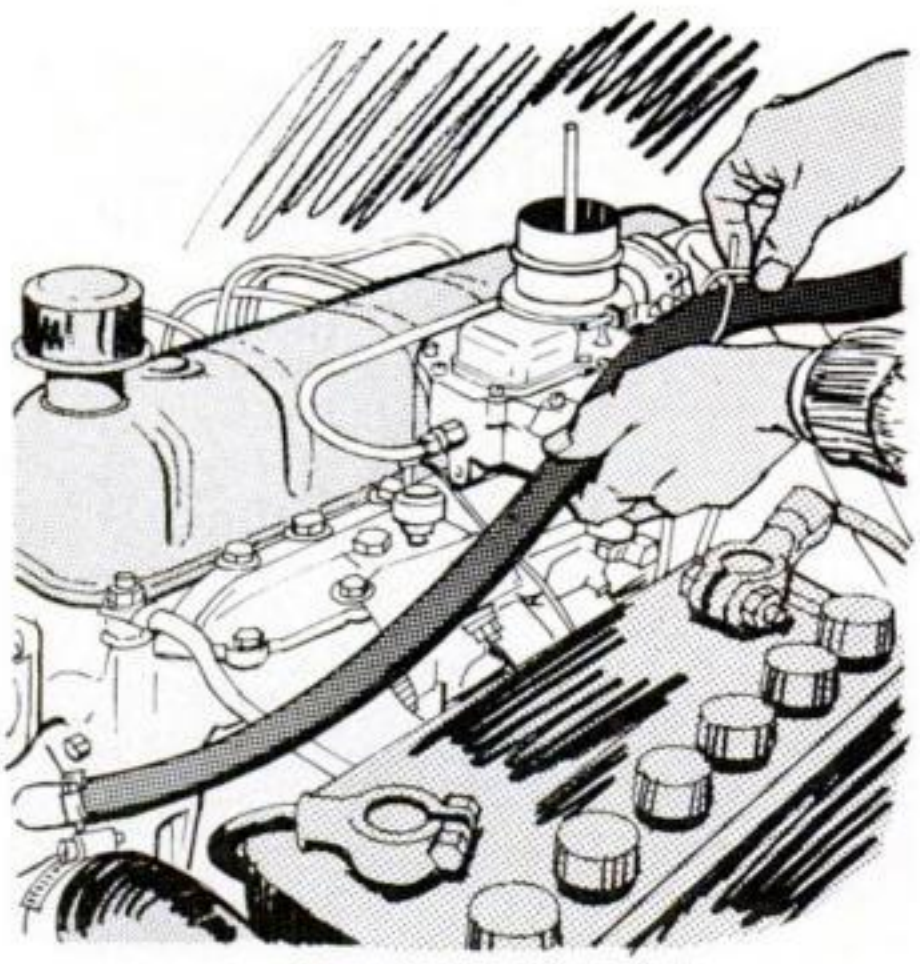
# Hints from the Model Garage



**Lifting your car** off the ground so you can work under it comfortably need not be hard. Auto-lift blocks assembled by nailing scrap two-by-fours or, better yet, two-by-sixes or two-by-eights, to form ramps with flat tops do the trick. If you plan to lift only one wheel, two-by-fours will do, but for both front or rear wheels, the wider ramps are less apt to topple and are safer. The blocks shown are 17, 22, and 27 inches long. They raised the car off the ground enough to make dropping the pan easy.



**Expanding a heavy spring** that works under tension, like a Chevrolet clutch-return spring, calls for a special tool. Bending the spring and wedging it open with flat washers does it. With the spring in place, depress the clutch and the washers will fall out.



**Improve short-trip economy** by rerouting a heater hose so it touches the choke thermostat housing. Heat from the hose keeps the choke from closing during the short pause between errands so the engine uses less fuel and cylinder bores wear less rapidly.



CONTINUED

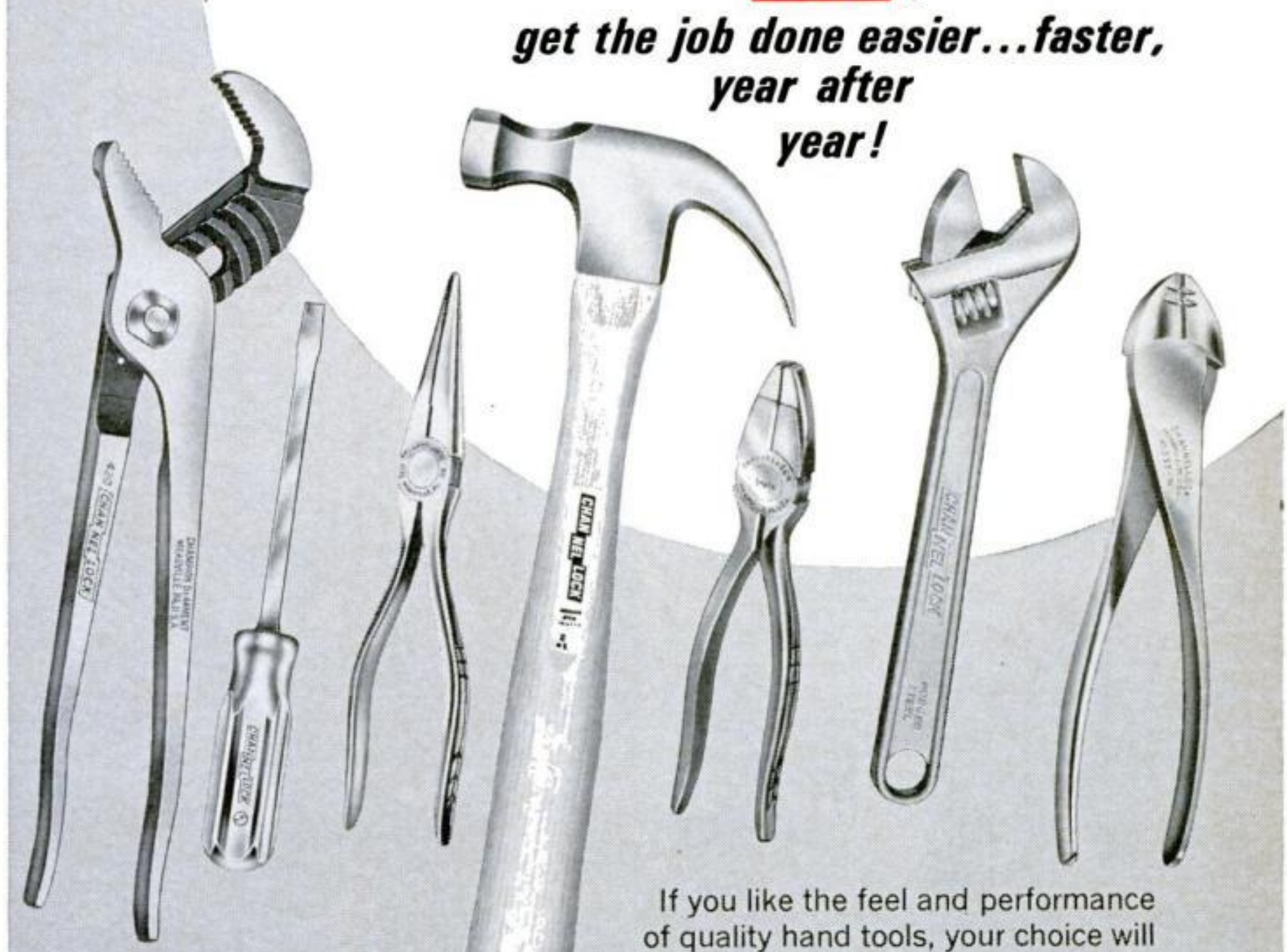
Urheberrechtlich geschütztes Material

# *In his hand or yours...*

**Tools by**

**CHANNELLOCK®**

***get the job done easier...faster, year after year!***



If you like the feel and performance of quality hand tools, your choice will be CHANNELLOCK. Drop forged of tough, high grade steel. Precision made in every detail. Beautifully finished. Built to last. Specify CHANNELLOCK . . . you'll be glad you did.

FREE Catalog showing complete line of hand tools . . . yours for the asking.

***CHANNELLOCK, INC.*** *Meadville, Pennsylvania*

*Formerly Champion DeArment Tool Co.*



Urheberrechtlich geschütztes Material

## More Hints from the Model Garage

**A mysterious engine miss** can be traced to the dipstick on some late-model Studebakers and other cars. If the stick is not completely pushed home and the loop of the handle is by mischance turned the wrong way, it can short out the coil primary wire.

**Distributor-lead order** can easily be mixed up when replacing wires in a V-8 distributor cap or replacing the cap. Eight numbered spring-type clothespins make it easy to keep track of which wire goes where if you have to remove them all at once.

**Spots on white convertible tops** can be hard to remove. Solvents often leave a dark ring. Many spots can be taken out with a soft pencil eraser or "soap" eraser. Simply rub the spot, which should remove the stain without smearing or leaving a mark.

**Reading oil level** with clean oil on the dipstick often can be difficult. Make it easy by prick-punching a series of dents in the dipstick. Oil will collect in the punch marks and show the level clearly. Small drilled holes work even better for visibility.



Urheberrechtlich geschütztes Material

Open . . . drop in . . . shoot!

# Kodak brings the Instamatic Camera idea to movies . . . and introduces a new era in movie enjoyment

**Kodak has redesigned the movie camera.** New KODAK INSTAMATIC Movie Cameras load *instantly*. Just slip the KODAPAK Movie Cartridge into the camera and shoot! No threading. No winding. No flipping. Zoom model shown, less than $160. Other KODAK INSTAMATIC Movie Cameras from less than $47.

**Kodak has redesigned the movie film** with 50% more picture area for better, sharper movies. The new KODAPAK Movie Cartridge is factory-loaded with improved KODACHROME II Film in the new Super 8 format —giving you 50 feet of uninterrupted shooting.

**Kodak has redesigned the movie projector.** The KODAK INSTAMATIC M70 Movie Projector lets you show any scene at normal, fast, or slow-motion speeds—forward and reverse. "Still" projection, too. Brilliant illumination, fully automatic threading. Less than $150. Other models are priced from less than $63.

*Prices subject to change without notice.*

**EASTMAN KODAK COMPANY, Rochester, N.Y.**

Kodak
TRADEMARK

[Continued from page 101]

This voice comes from a towerman who is watching the movement of the rain area on radar. Eight miles farther on he tells you: "Expect rain for 17 miles. We suggest you maintain 70 unless otherwise advised. If slower speed is needed, change to escape lane."

Seventy in rain? Lucky you're on the new NASA-developed rain tires. The voice again: "Look out for wind gusts." The green lights over your lane have changed to yellow. A short time later you're out of the storm area. A voice directs you to resume speed.

As you leave the Century later, you check your watch. You've come 388 miles in four hours' actual driving time for an average of 97 m.p.h.

***Planned for people.*** Cornell's able Robert Wolf, head of the group that conceived the Century Expressway, says it's not just a dream, not a racetrack, and not just for speed artists. "It's for *people*," he says. "Anyone can learn to drive at 100—if we give them the right kind of road, eliminate hazards, and put them in safe cars."

But how will your car stand up under a sustained 100 m.p.h.? Engineers say:

- Building an engine that can take you at a sustained 100 m.p.h. is no problem for today's luxury cars, and even for some middleweights. Industry spokesmen say they can have a general 100-m.p.h. engine for everyone by the time the Century is built.
- Maintenance will be far more important than now. Higher speeds will mean higher costs due to an increased wear rate, but regular preventive maintenance on cars designed for speed will keep costs down.
- Fuel consumption might be as high as 8-10 miles per gallon at 100 m.p.h. But new car shapes (and cleaner undersides) could raise this to 12-15 m.p.g.
- Puncture-proof premium tires will be a must, as today's top standard tires would quickly wear out at speeds over 85. The new tires may be the radial-ply type with rigid, nonextensible breaker plies to eliminate standing waves in the fabric and reduce heat generation, rolling resistance, and wear. On the plus side, steady speeds will save wear caused by acceleration and deceleration, and easy curves will eliminate scrubbing on turns.
- How about stopping at 100 m.p.h.? A full stop might take from 500 to 1,200 feet. Although some of today's brakes can cope with a real 100-m.p.h. panic stop, they might be damaged and the car might spin. Fortunately, stops will not normally be needed. When they are, improved brakes—possibly of the disk type—will take the load.
- Your car's steering will be a bit more sensitive, and you'll want a lower turn ratio than today's 15-25:1. You may find yourself using a variable-ratio wheel with hourglass worm gear. This will give you slow response for 100-m.p.h. travel, quick response for parking and sharp turns.
- Today's lights will be hopelessly inadequate. The truth is, you're already overdriving your lights whenever you go 60 m.p.h. Your 100-m.p.h. car will be equipped with powerful, long-beam headlights. The senseless opposing traffic glare you face today will be ended by screening opposing lanes, while reflectors along your lane will guide you.

***Safe super-super expressways.*** The Century may be destined to become the prototype of our next generation of expressways, running between Los Angeles-Seattle, San Francisco-St. Louis, Chicago-Detroit-Washington, Miami-Texas, and Miami-Washington. Construction costs? About 30 percent more than our interstate roads of today.

The accident danger? Low, but when one does happen it will be, as one engineer says, a "beaut." In dense fog, the Century will use convoy cars guided by tone signals from a wire embedded in the pavement. Other cars will follow, possibly at about 50 m.p.h. To eliminate snow, venturi windslots may be tried. These direct a sharp blast at the pavement when the wind blows to clear snow away. Small individual vanes on all cars may also be used to blow snow downwind, or the road may be heated to melt it.

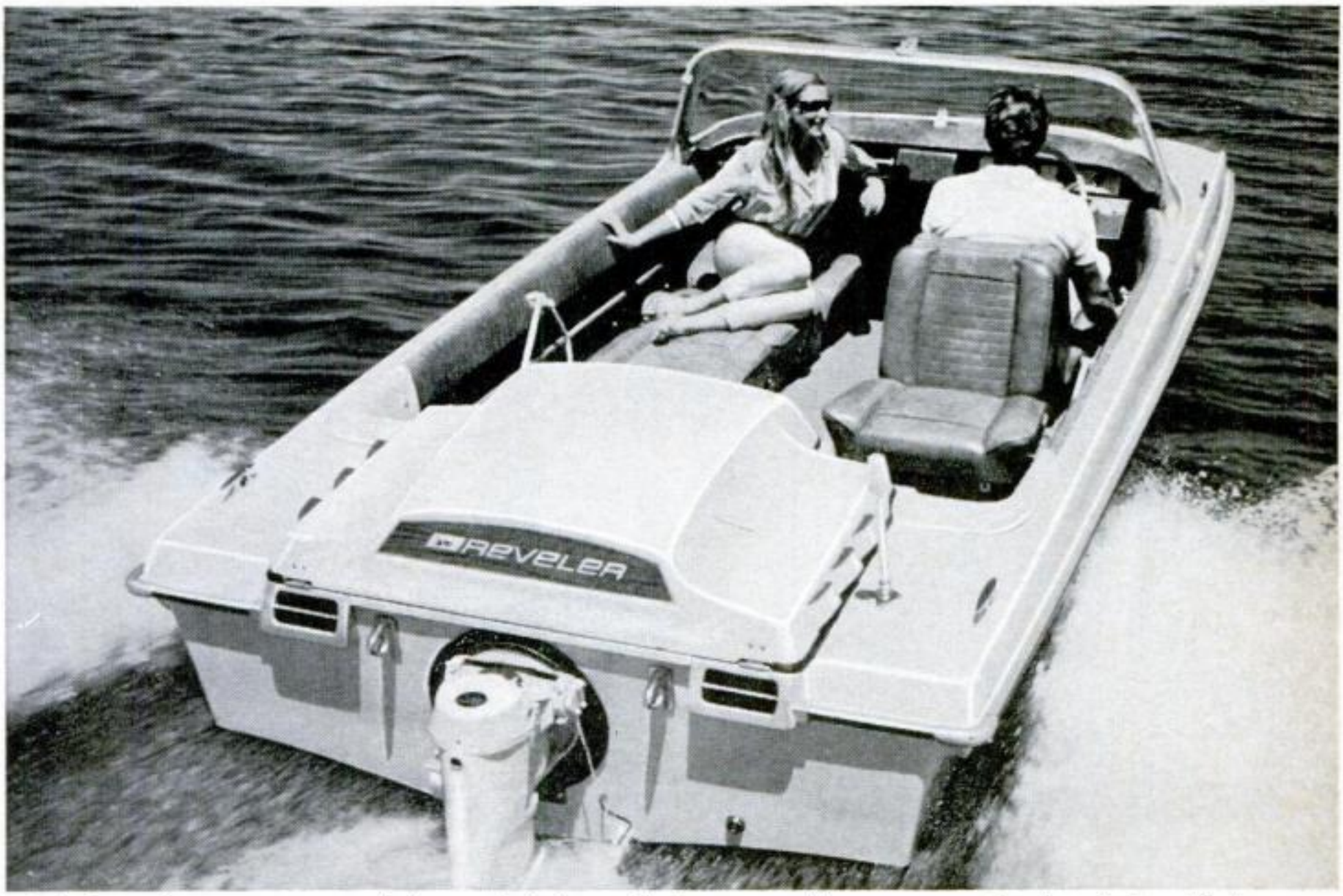
Preventive maintenance and extensive checking of vehicles will be one great key to accident prevention. If a car does get out of control, it may be cushioned by "forests" of small plastic posts. It may be absorbed into walls of plastic foam, or seized by slotted rails and guided—even sideways or backward—to safety.

Says one authority: "If we tackle this right, we *could* end up with a 100-m.p.h. road safer than anything today." ■■



Urheberrechtlich geschütztes Material

# 150 hp blonde!




Cruise in comfort on your own sundeck.

Built-in seats flank power nacelle.

Sports-car look and feel.

When you meet the golden "Reveler" one glance tells you here's a boat with all her curves in the right places. 16 feet of yacht-like luxury and eager power, all neatly stacked into our great new "SeaFoil"® hull, the sea-proved hull that has the *smooth* way with water over chop, across wakes, through fast turns. Her flat wake puts skiers on easy street. Never tippy at speed or at the dock.

Other charms include 150 and 120 hp power choices, deep foam-cushion fold-down seats with the look of saddle leather but the wear of vinyl, ash walnut trim, padded coaming, vinyl floor, easy-up convertible top. She's waiting at your Johnson Boats dealer. Don't be late.

**See all 5 new Johnson Boats — 3 with new "SeaFoil" hull . . . 2 with the popular three-point hull — 14'9" to 19'1" . . . 90 to 200 hp.**

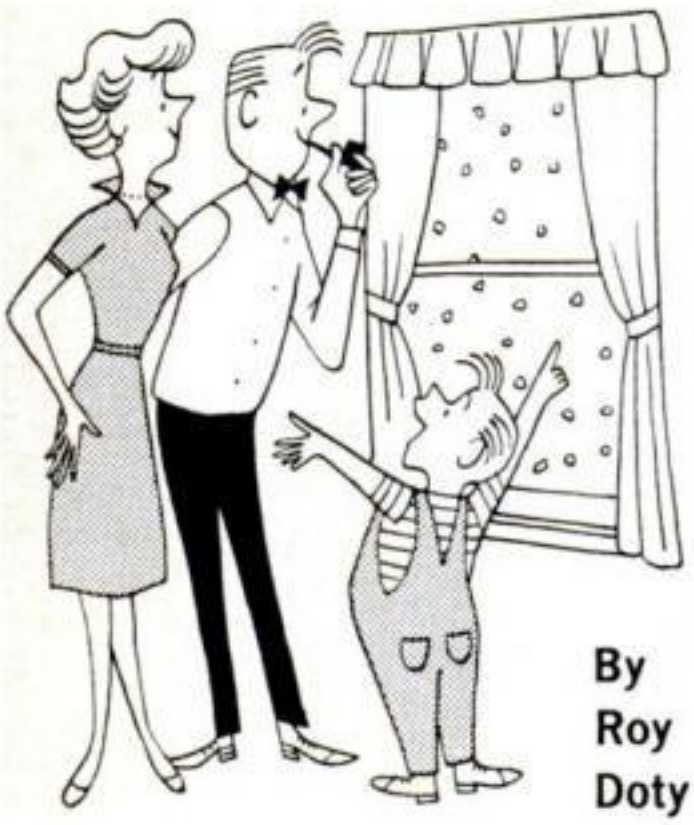
**ANOTHER NEW *Johnson Boat* WITH SEAFOIL® HULL**

Johnson Motors, Dept. PS-B2, Waukegan, Illinois 60086 • Division of Outboard Marine Corporation



Urheberrechtlich geschütztes Material

# Wordless Workshop



By Roy Doty

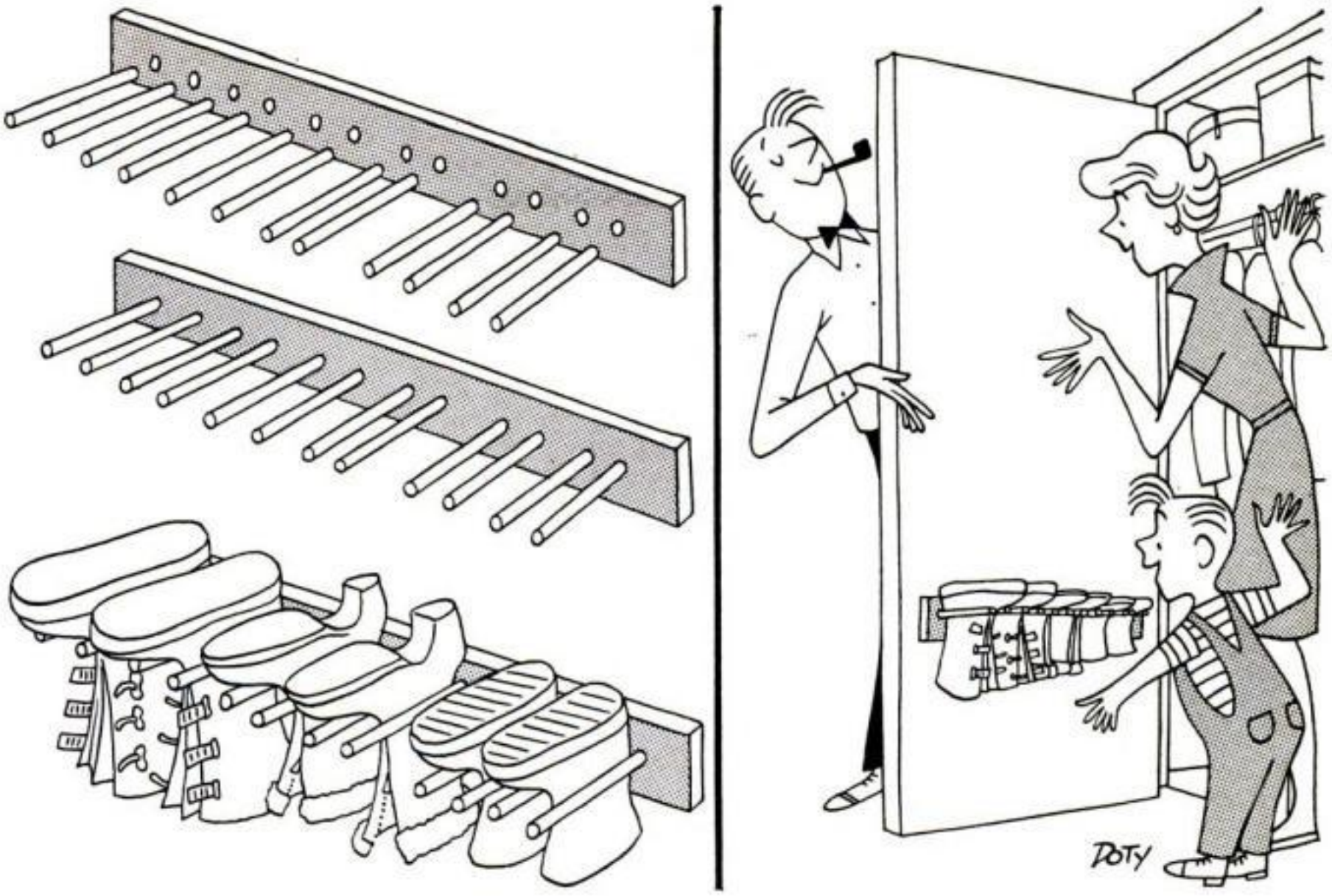
**It's just like having TEN**

**STANLEY QUICK-POINT KNIVES**

These amazing new break-away blades are found only in the NEW STANLEY QUICK-POINT KNIFE (No. 09). Ideal for scoring and general cutting. Quick, safe push button advances new ten-point break-away blade. You simply snap off old point, and have new point instantly. You can *change* blades, *store* blades without taking knife apart!




Urheberrechtlich geschütztes Material




# sharp knives on hand. Why?

## Because there are ten sharp points per blade

Two ten-point break-away blades are provided with this quality Stanley Tool . . . *plus bonus blades* . . . two double-pointed reversible utility blades for heavy duty cutting all stored in magazine handle. Comfortable contoured handle is aluminum for light weight and high strength. Stanley Tools, Division of The Stanley Works, New Britain, Connecticut. Sold practically everywhere.

STANLEY®

THE TOOL BOX OF THE WORLD



Urheberrechtlich geschütztes Material

# you and your boy

Share a Dremel Moto-Shop. You get close to your boy when you team up with this versatile jig saw. It's ideal for hobby projects, home maintenance jobs.

But don't be deceived. Moto-Shop is not a toy. It's a dad-size tool — a craftsman's tool. Yet it's so simple to operate a small boy can master it in minutes. Completely safe, too. Moto-Shop weighs only 10 lbs. — you can store it on a closet shelf.

## DREMEL MOTO-SHOP

Big capacity! 15" throat — cuts 1¾" wood, light metal, tile, plastics • Ball bearing motor • Table tilts 45° • Saws in any direction • No belts or pulleys. **Model 571** Jig Saw with disc sander (as shown), $33.95. **Model 572** Deluxe Jig Saw with disc sander, grinding wheel, wire and cloth buffing wheels. Plus 30" flexible shaft and 12 piece accessory set for grinding, drilling, routing, carving, $49.95.

***Ask your power tool dealer for a demonstration or mail coupon for free literature.***

**DREMEL MFG. CO.**
**Dept. 915-J, Racine, Wis.**

Please send me your free catalog on Dremel power tools

Name _____

Address _____

City _____ State _____

4693


[Continued from page 105]

the verniers keep the vehicle from somersaulting. At the end of the 40 seconds the retro engine will burn out and be automatically jettisoned.

The vernier motors will keep firing—slowing the spacecraft from a speed of 240 m.p.h. at about 25,000 feet to 3½ m.p.h. at 13 feet. Closing distance and speed, meanwhile, will be gauged by a radar altimeter and a three-beam Doppler velocity sensor.

To avoid stirring up dust, the verniers will cut off at 13 feet. Surveyor will fall that short distance at an estimated speed of six to 10 m.p.h., about that of a parachute jumper's touchdown.

***Three-point landing.*** The impact will be cushioned in three ways. Surveyor's 12-inch rounded foot pads are made of aluminum honeycomb, a stout but crushable impact-absorbing material. The craft's flexible legs contain pneumatic shock absorbers. Blocks of aluminum honeycomb at the base of the frame take up any residual shock.

If Surveyor does not sink out of sight in moon dust, or topple into a ravine, or go end-over-end down a steep slope, its first act on landing will be to obey a radio command to aim its flat high-gain directional antenna at the earth, and its solar panel at the sun. Then it will be ready to start reporting what the surface of the moon is like.

Surveyor 1 will be the first of at least seven spacecraft of its basic type to be sent to the moon, in a series of launches lasting through the coming year. Later Surveyors will weigh about 2,450 pounds, including 114 pounds of scientific equipment. They will carry three TV cameras equipped with rotatable color filters. One will take approach photos. The two others will survey the moon in stereo, for three-dimensional information about the landscape.

Beginning with No. 5, these later Surveyors will also report on surface bearing strength, moonquakes, and meteorite hits. They'll dig little trenches, with a toy-size scoop on an arm of five-foot reach, to learn if the lunar surface is soft or hard. And an atomic device will chemically analyze the surface material.

By the time all the reports are in from this family of lunar exploring vehicles, we should have a pretty definite idea of just what our Apollo astronauts are going to find underfoot on the moon. ■ ■



Urheberrechtlich geschütztes Material

# Last winter, typical Ariens Sno-Thro owners removed over 2 tons of snow after every 6" blizzard...without lifting a shovel...Did You?

Ariens Sno-Thro owners have 20-20 foresight. They **know** it's going to snow again this winter. They **know** that a 60 foot sidewalk alone is weighted down with approximately 1,000 pounds of snow after every 6 in. blizzard. If you tackle this kind of drudgery with a shovel, you're lifting—not living. This winter, swing over to an Ariens—the powerful 2-stage Sno-Thro with 4 speeds forward and reverse. Whatever your needs—a 6 or 4 h.p. Ariens removes snow fast . . . and with the 6 h.p. Trac-Team attachments you can mow the lawn in summer —vacuum leaves in the fall. See your Ariens Dealer now . . . whatever the weather.

Ariens COMPANY

**159 Calumet Street • Brillion, Wisconsin**



Urheberrechtlich geschütztes Material

# New from Du Pont

## Does 2 jobs!

**1. It's a sealer**
stops leaks saves costly overhauls

**2. It's a tune-up**
restores transmission additives to a safe level

## Add T-seal to your transmission

- when fluid level is low
- when you change fluid
- if transmission is rough or noisy
- if it is leaking
- if it is slipping
- every 10,000 miles

**Safe for every car with an automatic transmission**

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY DUPONT



[Continued from page 159]

down through the knockout hole. (You have to work through a knockout as it's usually not practical to remove the box from the wall.) Move the upper wire around to link hooks with the lower one, then haul up the cable and anchor it in the box.

The cable end should be prepared in advance. If it's BX, 8″ of armor should be removed and a fiber bushing inserted as described earlier. If the starting box lacks built-in cable clamps, mount a cable connector on the cable before hauling it up through the wall. Connect the white wire to the chrome terminal screw, the black one to the brass. Fasten the receptacle back in the box, replace the box cover plate and your new fixtures are ready for action.

***Leading cable to a ceiling fixture.*** If you have an unfinished (unfloored) attic, this is a cinch. Simply bore a ⅝″ hole down into the wall directly above the starting box. With current off, remove a knockout from the top of the box, and use the hook-ended wires to snake the cable down from the attic to the box. Lead the cable across the attic to the ceiling opening, fastening it as in the basement. Connections at the ceiling fixture are exactly the same as at wall fixtures. A ceiling hole must be cut to match the box used.

If the attic is floored, you must lead the cable into the ceiling from below the floor. It must, of course, run across the ceiling parallel to the joists. You can tell their direction from those in the basement, as they run in the same direction in almost all houses. If the cable runs to the ceiling from a wall opening (as for a switchbox), the job will be easier. In most cases it's necessary to bore several holes into the plate that supports the floor above, and complete the opening with a chisel. For the long spans involved you'll do better with a reel of electrician's fish tape than with wire. As the tape is flat, it slides without kinking but can be hooked or bent as required. A 50′ length on a reel costs around $3.

In large houses there may be an attic wall directly above the wall through which the cable rises. In this case, you can bore a hole downward diagonally into the lower wall, after removing the upper baseboard. The fish tape may then be slid down through this hole and linked with wire or



Urheberrechtlich geschütztes Material

tape aimed upward from a wall opening or up-hole from the basement. For the basement situation it's best to use wire for the upward hook, tape for the downward one. If there's no opening in the wall for a new box, you can make the fishing job easier by removing the baseboard and cutting a hole behind it large enough to reach in and link the hooks. The replaced baseboard will cover the holes.

A problem you may encounter in old houses is the fire stop. This is a two-by-four crosspiece fitted between studs part way up the wall to prevent flames from channeling upward in case of fire. This blocks your tape or wire inside the wall. The only remedy: Locate the fire stop by measuring the wire that reaches it. Then cut into the wall and notch the wood to make a passage. If wallpaper must be removed, razor-cut the outline first, then steam it off, so the patch can be replaced. This is tricky and doesn't always work, but it may save repapering if you can't match the paper. One other possibility: You can notch into the opposite face of the wall if that side is easier to patch.

***Other jobs.*** Wiring for cove, cornice, and valance lighting is the same as for ready-made fixtures, but requires some special hardware as the light must be evenly distributed along the length of the built-in.

Fluorescent lighting does the trick nicely. Residential sizes vary from a 6″ length for four watts to 5′ for 100 watts, and produce up to three times as much light per watt as regular bulbs. Prices are higher than equivalent bulb units, however, averaging around $8 (less tube) for a 40-watt fixture a little over 4′ long. This is a strip-lighting budget unit that consists of a plain white-enameled box (housing all circuit parts) with a lamp holder at each end to support the tube. The circuit is the rapid-start type that requires no starter. With the older preheat circuit and starter, the price is a dollar or so less, but the tube takes a second or two to light.

Tubes are also available in circular- and square-panel form. Your best bet if you plan a fluorescent installation: Check over the wide variety of fluorescents available. Most fixtures are designed to fit on standard boxes or to connect directly to a cable through knockout holes in the fixture itself. Electrical connections are the same as in bulb fixtures.

CONTINUED

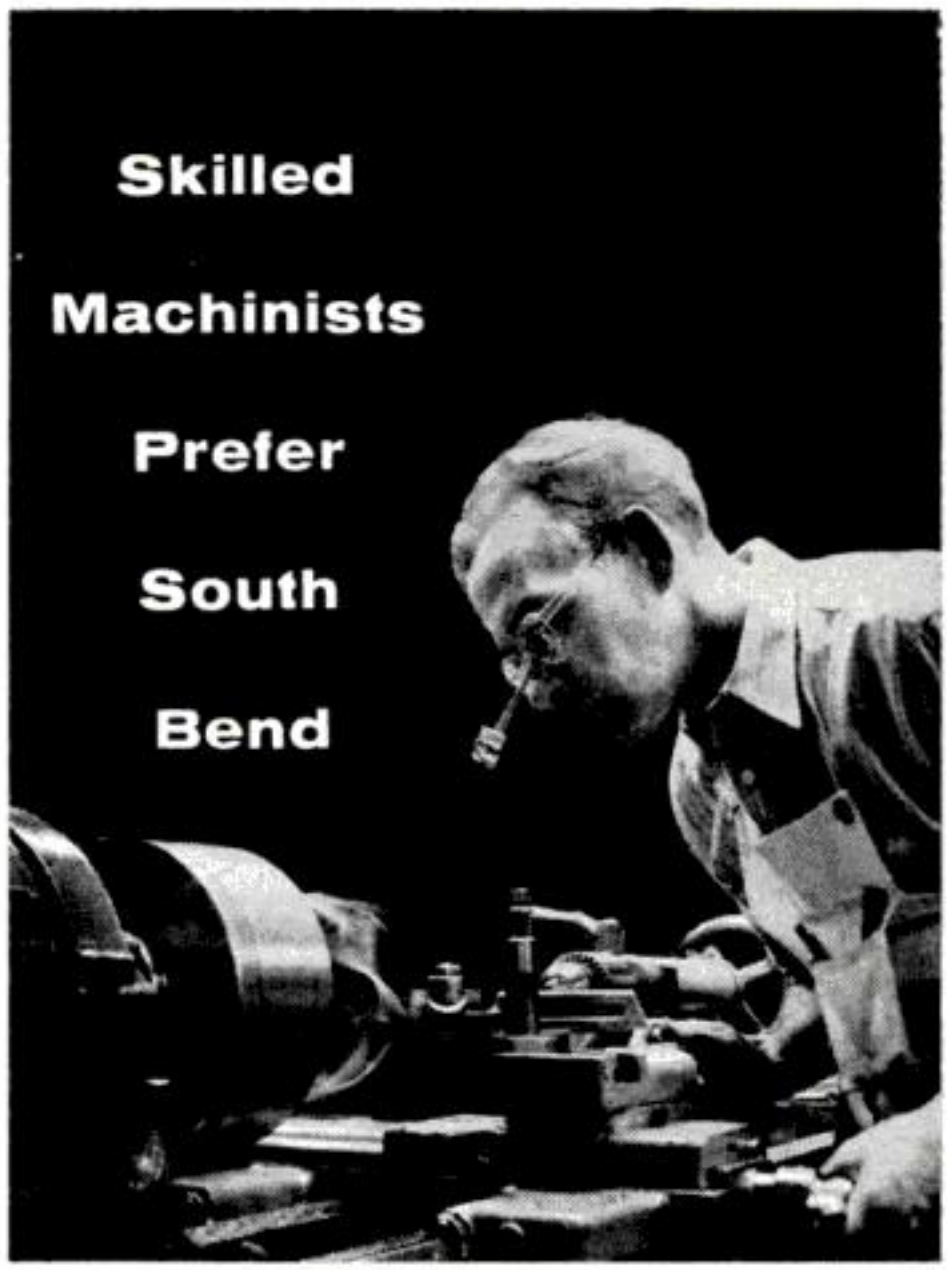




Photo from Learcal Division, Lear, Inc., Los Angeles

The day of the precise craftsman is not past. You should see how some of the nations finest workmen go about doing their jobs with painstaking accuracy.

Such accuracy is absolutely vital in the manufacture of many of the precision components that make this "Space Age" possible.

To get the accuracy-and fine finish so necessary on precision parts, skilled machinists choose South Bend® 16″ Lathes.

- **Dependable—Trouble-Free**
- **Spindle bearings designed specifically for precision work.**
- **Quiet running—No Vibration—No Gear Marks —Delivers parts with extremely fine finish.**

Prices of South Bend 16″ Lathes start at $2591 f.o.b. factory

*Write for catalog of South Bend Lathes, Milling Machines, Shapers, Drill Presses*

SOUTH BEND

LATHE, INC.

SOUTH BEND 22, INDIANA

BUILDING BETTER TOOLS SINCE 1906




Urheberrechtlich geschütztes Material

**Put snow in its place fast with a GRAVELY**

Clear driveways, walks, paths or lanes in an easy hurry with your all-gear drive Gravely Tractor and all-gear drive Snowblower. Or, choose from any of these ready-to-go snow removal attachments . . . 26″ Snowblower, 48″ Snowplow, 35″ Scoop, 30″ Scraper Blade or 38″ Power Brush.

Electric or manual starting. Instant forward and reverse in four speed ranges.

Great in the snow, the Gravely Tractor is great the year 'round too. You ride or walk with a wide range of attachments for mowing, gardening, general grounds care and upkeep.

Give the Gravely a go . . . at your local Gravely Dealer. Or, send for your free catalog. Write now.

**GRAVELY**

TRACTOR DIVISION Studebaker CORPORATION

5810 Gravely Lane
Dunbar,
West Virginia 25064


### Improving Your Home Wiring

Raceway bulb sockets offer the easiest way to get even bulb lighting along the run of a lighting built-in. Plugmold No. 2100 (made by Wiremold Co.) can be fitted with bulb sockets at spacings as close as 3″ and can be connected to any approved cable

***Mounting precautions.*** In mounting lights in built-in lighting units, do not mount bulb fixtures with bulbs closer to the woodwork than the normal distance from a bulb to a lampshade. The multi-outlet raceway itself, however, may be mounted directly on the wall, as the raceway remains at room temperature. Although fluorescent tubes operate at a much lower temperature than bulbs and can be mounted closer to woodwork, the fluorescent strip or fixture containing the circuit parts should not be mounted on a combustible surface. The ballast coil inside the unit generates considerable heat. The safest mounting: Set the strip box on metal brackets that allow air space between it and the wall. The strips may also be mounted on wood blocks, but check with your local inspector first. ■ ■

## Ferry lifts prow to load cars

One of the 180 cars this ferry is built to transport across the English Channel is driven off its ramp at Cherbourg. The bow of the Norwegian-designed Viking I is hinged to the deck at top, lifts when the ship docks to let cars on and off. The ship also takes 800 passengers on its run between Southampton and the French port.



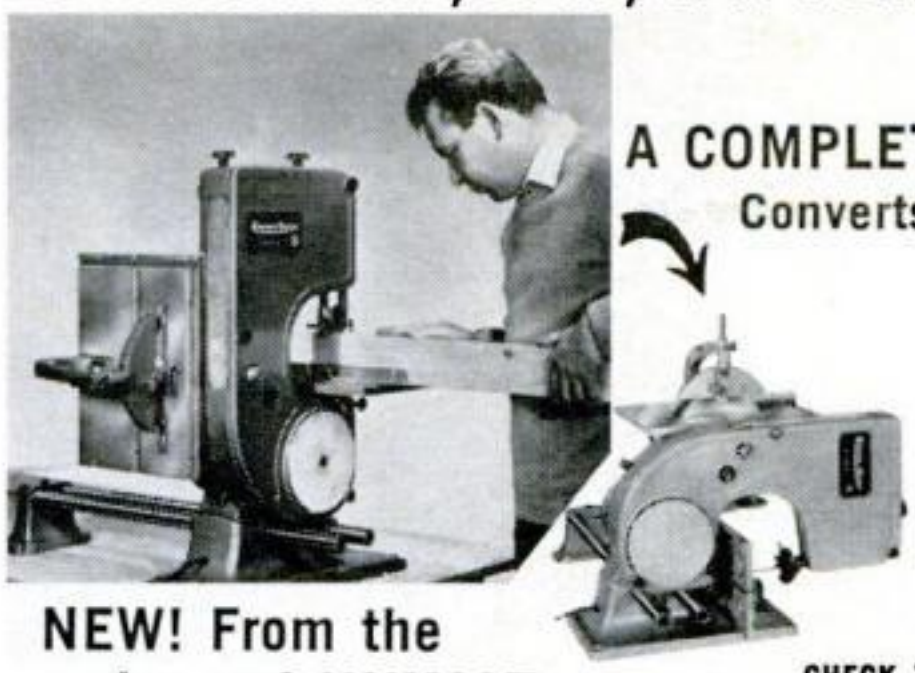
Urheberrechtlich geschütztes Material

# SENSATIONAL, NEW, ALL-PURPOSE WOODWORKING MACHINE

## 6-IN-1 EMCO-STAR

### A COMPLETE SHOP FOR HOME & INDUSTRY!

**Converts from one Operation to Another . . . IN SECONDS!**



- 6" BANDSAW
- 8" CIRCULAR SAW
- 7" DISC SANDER
- BELT SANDER
- JIG SAW
- SABER SAW

New Emco-Star is the **fastest** change-over machine ever! With just the flick of your wrist, you switch from BANDSAW to CIRCULAR SAW as quick and easy as turning on the motor. Unlike other combo-machines, EMCO-STAR lets you go from sawing to sanding, **without tearing down half the machine!**

**NEW! From the makers of UNIMAT . . .**

**$189.* Complete**

**$33 Down — $14.50 Monthly for 12 Months**

*Prices F.O.B. New York City

**CHECK THESE EXCLUSIVE EMCO-STAR FEATURES:**

- ✔ The only combo-machine that gives you BANDSAW & JIGSAW **as part of the basic unit!**
- ✔ Factory-Direct-To-You Price makes this the lowest priced quality combo-tool available!
- ✔ Convenient size—just right for space-crowded homes. Compact enough for portable use!
- ✔ All rotating shafts are ball-bearing equipped!
- ✔ Precision-built by the makers of UNIMAT—world famous multi-purpose metalworking lathe!
- ✔ Add Wood Lathe & Moulder with attachments. Full accessory line available.

BASIC EMCO-STAR includes: BANDSAW, CIRCULAR SAW, JIG & SABER SAW, BELT AND DISC SANDER — all powered by hefty ¾ hp 2-speed 115v motor! All operations at 1725 or 3450 rpm! PLUS blades and sanding accessories! Ready to use.

**Priced fantastically low, the best tool buy of the year. Send for your EMCO-STAR today. Write for free literature.**

**AMERICAN EDELSTAAL, INC., Dept. HE-J5, 350 Broadway, New York, N. Y. 10013**

---

# Put yourself in the "Commander's Cockpit"..

*Earn as much as $10,000.00 yearly and more!*

Enjoy the excitement, adventure and prestige that can be yours as a pilot of giant over-the-highway transport rigs! Join the exclusive corps of keen-eyed, quick-thinking, professional men who help maintain America's life-line. Thousands more such men are needed now by the highway transport industry. If you can drive a car, chances are you can qualify for training to be a professional operator of the kings of the highway at National . . . the East's foremost motor transport academy located just 27 miles from Philadelphia.

*Right now* could be your opportunity of a lifetime to earn those big wages and security you've always wanted for your family! And it costs you nothing to find out . . . simply fill in and mail the coupon. Sound interesting? Of course it does! DO IT NOW! 9396

**FILL IN AND MAIL NOW FOR INFORMATION**

**National Professional Truck Driver Training Dept. PSE-1**
**P. O. Box 404 Millville, New Jersey**

Please send me complete information without obligation about how I can become a professional truck driver.

Name_____ Age____

Street_____

City_____ County_____ State_____

Phone_____ Time Usually Home_____



Urheberrechtlich geschütztes Material

# BOND STREET

*The Pipe Tobacco that stays lit!*

Bond Street keeps burning because of its old English cut—a combination of flakes for even-burning and cubes for slower-burning. You'll like its aroma of fine domestic and imported tobaccos, too.

*How to scrape your pipe*

Carefully. Use a reamer and scrape so you cut only the carbon, not the briar. One way to stop superficial caking from forming is to scrape the bowl several times a week.

*A dog needs a boy, a boy needs his father, and his father his pipe.*

A product of Philip Morris Inc.



**CLEANS OLD PAINT BRUSHES *QUICKLY***

IMPERIAL Brush Cleaner restores hard-caked brushes, leaving bristles soft and springy. Swish out brush for quick color changes and when through painting.

Imperial pays its way in money saved on brushes. At your paint or hardware store.

Write for free folder "Care of Paint Brushes"

**Send 25¢ for Refinishing Guide**

WILSON-IMPERIAL COMPANY
121 Chestnut St., Newark 5, N.J.

## What Makes Stan Musial THE MAN

[Continued from page 128]

***Take it easy?*** In 1959, he went along with management's view that, because he'd tired late in the '58 season, he ought to take it easier in spring training, not run as much or play as many exhibition games. After 17 seasons of hitting between .312 and .376, he dropped to .255 and most observers felt that The Man was through. Although he was nearly 39, he proved he was far from through.

The last four years he played, Musial worked vigorously each winter at the St. Louis University gymnasium under Walter Eberhardt, director of physical education.

"It was good to get back into a gym," Musial said. "I'd relied too long on sensible living and pushing myself away from the table in the off-season. I needed to push up as well as away." Musial was so enthusiastic about Eberhardt's results that the educator now directs the entire team's conditioning each spring.

In Musial's first year out of uniform, he hit the road as a government fitness consultant and Cardinal's vice-president. He slept less, ate irregularly, got little exercise. He soon became exhausted. Musial collapsed in the Cards' clubhouse. He was rushed to a hospital, close to shock.

***Learning to say no.*** "I learned another lesson," Musial says frankly. "I had to say no to people, get more rest, and at least some exercise. As space research proves, physical activity is as essential as sleep and food."

He made time to use his home gym equipment. Musial has a one-piece, all-purpose apparatus that makes uphill sit-ups tough. Sit-ups and push-ups are daily staples in his own fitness program—even in a hotel room.

Musial says his daily exercises take 30 to 45 minutes. These include 25 or more push-ups, 25 or more pull-ups, and 50 sit-ups. But he feels that his main exercise is running. "Inside or outside, in place or in motion, running is very good," he says. "It enables me to break a sweat and to breathe deeply. It's necessary to become slightly winded to have a good workout, to get the blood pumping for better circulation."

His own good results have convinced him that the more sedentary a man's job is, the more effort he has to make to get some kind of regular exercise—even if it's only brisk walking. ■■

Urheberrechtlich geschütztes Material

# FREE CATALOG.

## *250 "Do-It-Yourself" Electronic Kits At Up To 50% Savings*

**WHY BUILD HEATHKIT ELECTRONICS?** A desire for top-quality products at 50% savings, to be sure. But it goes beyond that. The reason people choose Heathkit is pride. Not just the pride of owning something new, but something a bit better that you have created yourself! From watching your Heathkit grow and take shape from your own efforts. It's a labor of love and a lot of fun. The large pictorial diagrams and simple, step-by-step instructions make it easy. And when you finish and turn it on you'll know that unique self-satisfaction that comes with "do-it-yourself." You will have joined the millions of people, from ages 11 to 79, people with no special electronic skills or knowledge, who successfully build Heathkits. People like you! Give it a try. Your FREE Heathkit catalog is waiting for you now.

## World's Largest Selection Of Electronic Kits

**NEW** Low Price On Heathkit 21" Color TV . . . Only $375.00

**NEW** Transistor FM Stereo Tuner That Assembles In 6 Hours Or Less . . . Only $49.95

**NEW** Low Prices On Many Heathkit Stereo/Hi-Fi Components

**NEW** Deluxe Shortwave Radio . . . Only $84.95

**NEW** 23-Channel, 5-Watt All-Transistor CB Transceiver . . . Only $89.95

- ★ See The Vast Selection Of Portable And Table Model AM, FM and Shortwave Radios
- ★ See The Famous Heathkit/Thomas Transistor Electronic Organs
- ★ See A Complete Selection Of Home & Hobby Items . . . Intercoms, Garage Door Opener, Automotive Kits, Tools, Color TV Sets
- ★ See All Heathkit Stereo/Hi-Fi Components . . . Tuners, Amplifiers, Speakers, Turntables, Cartridges, Furniture
- ★ See The Full Complement Of Heath Marine Electronics
- ★ See The Complete Line Of Citizen's Band Radio Gear . . . Transceivers, Walkie-Talkies, Accessories
- ★ See The Wide Selection Of Heath Educational Kits For Home Or Classroom Study
- ★ See The World's Largest Line Of Amateur Radio Gear
- ★ See The Full Line Of Heathkit Lab & Test Instruments For Home Workshop, Industrial & Educational Use

**MAIL COUPON FOR YOUR FREE COPY ▶**

HEATHKIT®

**HEATH COMPANY, Dept. 16-10**
Benton Harbor, Michigan 49023

☐ Please send FREE 1966 Heathkit Catalog

Name_____

Address_____

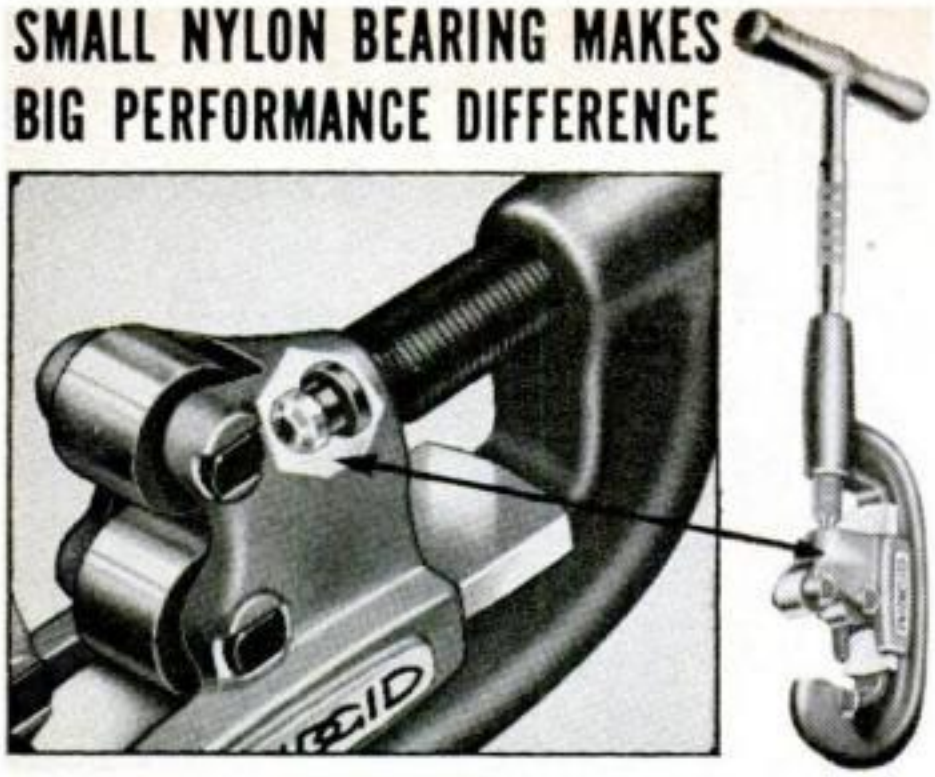
City_____ State_____ Zip_____

Prices & specifications subject to change without notice. CL-215



Urheberrechtlich geschütztes Material

SMALL NYLON BEARING MAKES BIG PERFORMANCE DIFFERENCE



**That's why RIDGID Pipe Cutters are easiest to use . . . cut the straightest!**

**Cuts all ⅛″ through 2″ pipe and conduit**

Start feeding a RIDGID Cutter into a pipe and you'll feel a remarkable difference. Its smooth, cushioned action makes cutting easier, faster and more accurate. Why? Because the feed screw turns freely on a nylon bearing. This same bearing also absorbs shocks, resulting from uneven pipe surfaces, to let the cutter wheel track smoothly. This means less work for you. . . and straight, even cuts every time.

You can get this Cutter and other RIDGID Work-Saver Tools at your Dealers.

RIDGID

**THE RIDGE TOOL COMPANY, ELYRIA, OHIO, U.S.A.**

**GRINDS** **POLISHES**
**DRILLS** **SHARPENS**
**CARVES** **DEBURRS**

No. 2 Moto-Tool Kit Illustrated

**MOTO-TOOL**
**THE POCKET SIZE MACHINE SHOP**

**Handiest tool you'll ever own. Does fine detail work with pin point accuracy. Eliminates time consuming hand work. Gets into places difficult to reach with larger tools. 27,000 RPM. Collet sizes 1/8", 3/32" and 1/16". An industrial favorite since 1936. Wt. 13 oz.**

**NO. 2 MOTO-TOOL only . . . . . $19.95**
**NO. 2 MOTO-TOOL KIT with 23 accessories in steel case . . . . . $29.95**

**NEW HEAVY DUTY NO. 3 MOTO-TOOL**

**New high torque motor designed for hard industrial use. Same features as No. 2 plus 50% increase in power.**
**NO. 3 MOTO-TOOL only in steel case . . . . . $29.95**
**NO. 3 MOTO-TOOL, 23 accessories, steel case . . $37.95**

SEE YOUR DEALER OR WRITE FOR CATALOG
Dremel Mfg. Co. • Dept. 125-J • Racine, Wis.


## Before You Buy a Billiard Table

[Continued from page 111]

• Get a table with live rubber cushions. The best cushions are molded from natural rubber. Extruded rubber tends to be uneven in liveliness. Test the cushions by shooting or rolling several balls against them to see if there is a lively rebound. The cushions should be flush with the bed of the table and no higher than the rail. If a ball "hops" off or digs into the cushion, the cushion is probably badly aligned.

• See that the table covering has a good nap. The best cloth is all wool, but you won't get it on an inexpensive table. These generally are covered with cotton, which plays well. But cotton nap tends to mat quickly and requires frequent brushing to keep it playable. A cotton-wool or rayon-wool blend is a good compromise.

• Check for the accessibility of leg-leveling devices. You'll need them to compensate for your uneven floors.

• Pocket openings should not extend beyond the cushion. If you roll a ball along the cushion and it drops into a side pocket, the pocket is too big. Corner pockets should measure 4⅞ inches minimum and 5⅛ inches maximum. Side pockets can vary from 5⅜ inches to 5⅝ inches. The pockets should be made of one molded piece.

• Ball returns should be quiet, fast, and nonclogging. Drop a few balls into a pocket to test this feature. There should also be a built-in ball-storage shelf.

• Overhead wire scorers are definitely out. Your table should have a built-in scoring device.

• Avoid tables with sharp edges. Big rounded rails are more comfortable and better looking. Plastic-laminate finishes will hold up better than ordinary painted wood and are stain- and burn-resistant.

• Find out what accessories come with your table. Get at least two cues, cue-tip repair kit, chalk, a bridge, triangle, a set of 15 numbered balls and one cue ball. The best balls are made of a lathe-turned cast phenolic plastic 2¼ inches in diameter. But these usually come with tables costing at least $300.

Cheaper tables are generally equipped with injected-styrene plastic balls, which tend to have a more uneven roll. When styrene is injected into a mold, air is sometimes trapped in one side of the ball. This makes one side lighter and causes unevenness when they roll. ■■



Urheberrechtlich geschütztes Material

# Don't Buy Batteries Save $—Recharge Them!

over and over up to 15 times or more
the **EVERLITE** — the best — charges
more than all the rest.

**Only the *EVERLITE***

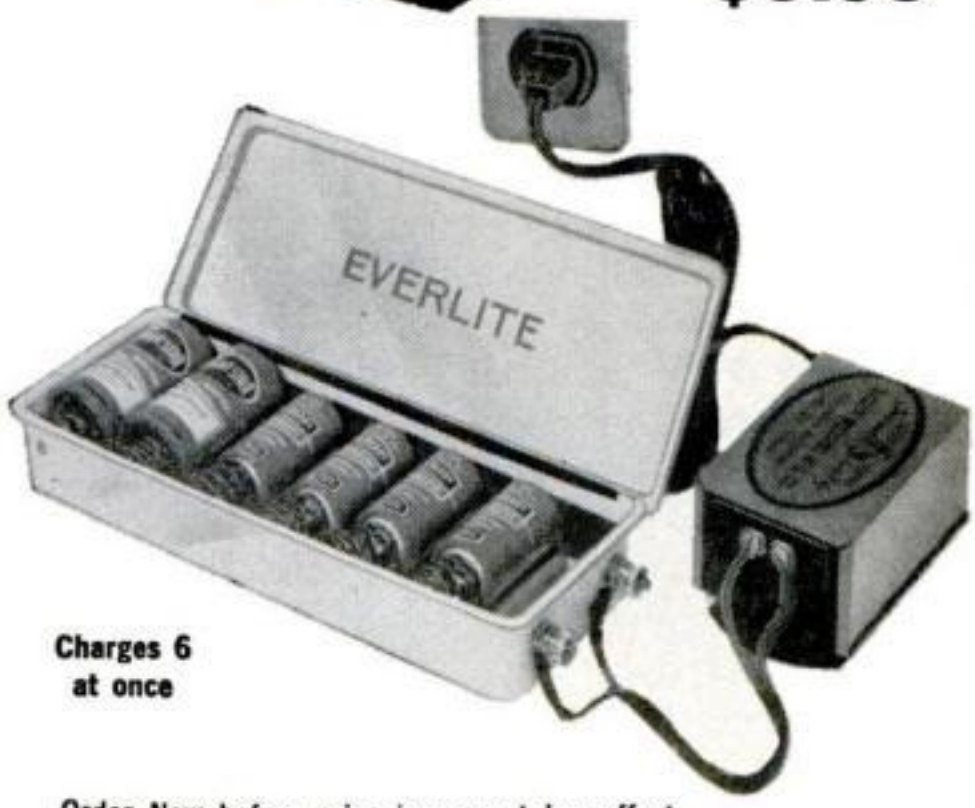
- Charges 6 at one time.
- Charges 3 times faster.
- Charges **all** batteries.

**ONLY**
**$5.95**

Be prepared. Always have fresh batteries when you need them. The EVERLITE is the only charger made which charges **all** batteries, flashlight, lanterns, toys, radio, telephone, hearing aids, cameras—yes, even mercury cells. Save money and have the convenience of fresh batteries always.

The EVERLITE is the best—**the only charger** built with a powerful magnetic energy winding. This power enables it to charge big lantern batteries and even car batteries. Also plays transistor radios on 115 v. house current charging the batteries at the same time. **Charges all batteries better.**

Two models—the EVERLITE 65 for all dry cell batteries up to 12 volts and the EVERLITE 66 for all dry batteries **plus** a special charge for car batteries to assure fast starts on cold mornings. Simple, safe, fool-proof and unbelievably efficient. Plugs into any 115 volt outlet. Guaranteed for one year. Send for your EVERLITE now—10 day money back guarantee.—You must be satisfied.

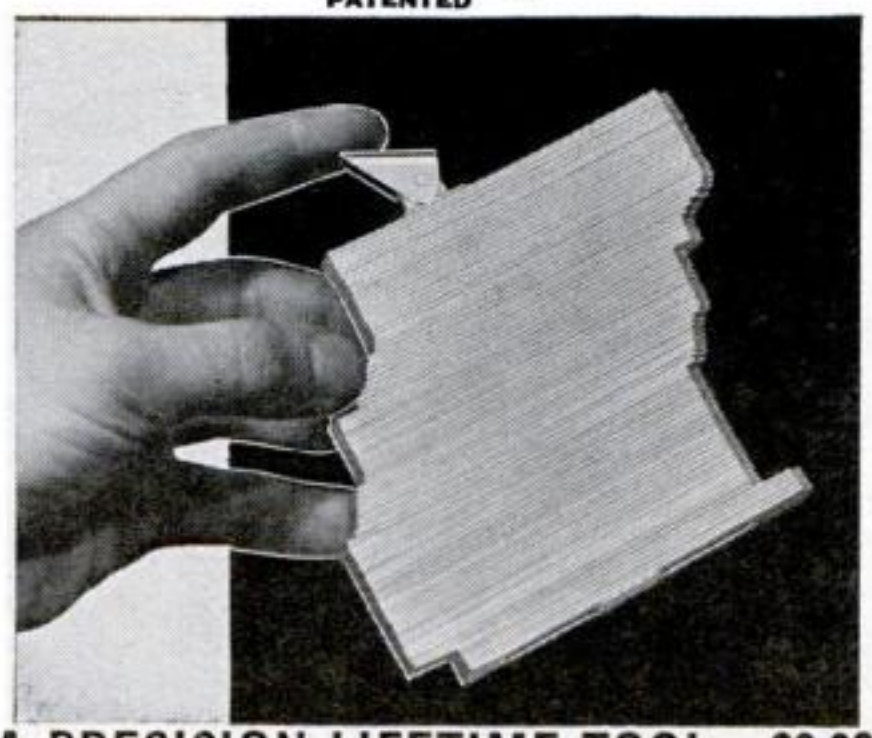



**Charges 6 at once**

Order Now before price increase takes effect.
Free battery tester and adaptor for special batteries included.
The EVERLITE 65—send $5.95 plus .55 for shipping.
The EVERLITE 66 (including car battery kit)—send $7.95 plus .75 for shipping.
Send $1.00 deposit if you wish C.O.D. shipment.
All items guaranteed for 1 year plus 10 day moneyback guarantee.

# CONTOUR COPY

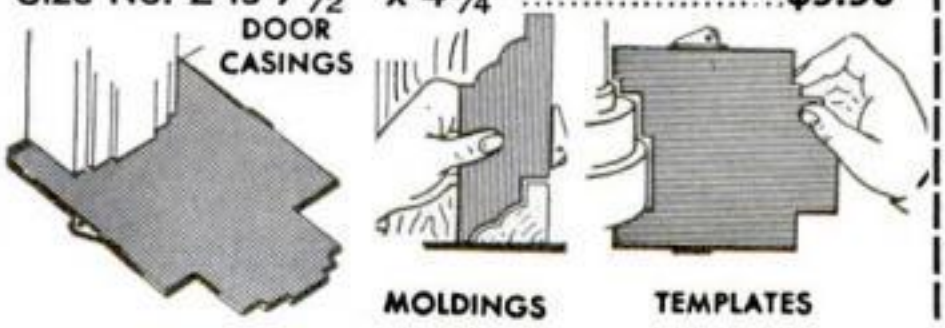
PATENTED



## A PRECISION LIFETIME TOOL—$6.90

Made of hardened aluminum alloy—will retain its accuracy indefinitely.

Size No. 1 is 4¼" x 4¼" ..... **$6.90**
Size No. 2 is 7½" x 4¼" ..... **$9.90**




## COPY ANY CONTOUR INSTANTLY
## Perfectly Accurate Every Time.

SAVES HOURS—SAVES MATERIAL. Can pay for itself on one job. The perfect tool for fitting in against door casings, bath fixtures, mouldings, pipes, sinks, masonry, etc. A real boon to pattern makers, sheet metal mechanics, tool makers and body men.

EASY TO USE—just push the gauge leaves against any contour and lock. A perfect template every time. Works against any surface or any material.

## Order Now from Master Mechanic Co.

**Mail order to Master Mechanic Co. Dept. B105**
**Box A Burlington, Wisc., or Box 98 Sarasota, Fla.**

Send.....EVERLITE 65 chargers at **$5.95 ea.** plus .55 shipping.

Send.....EVERLITE 66 chargers at **$7.95** ea. plus .75 shipping.

Send.....No. 1 Contour Copies at **$6.90 ea.** plus .55 shipping.

Send.....No. 2 Contour Copies at **$9.90 ea.** plus .65 shipping.

Name.....

Address.....

City.....State.....Zip.....



Urheberrechtlich geschütztes Material

[Continued from page 87]

in the central Pacific, have intercepted and "destroyed" a number of ICBM Atlas "warheads" fired 4,500 miles across the Pacific from Southern California.

***The Nike-X radars.*** The brains of Nike-X are in two ground installations: MAR (multifunction array radar) and MSR( missile-site radar). These radars don't have the revolving dish with which most of us are familiar. They are phased array radars. Instead of using turning antennas, scanning is done by electronic switching or "bending" of the radar beams—with a lightning swiftness that virtually gives "a look in every direction at once."

MAR is the smartest of the two, as well as combining four radars in one. It does many jobs, as the "multifunction" part of its name implies.

First it has to "acquire" an incoming object that might be an ICBM, locating it exactly in space. Then it calculates the object's speed, to see if it's ballistic.

Now comes the tough part—discrimination—picking out a nuclear head from among a number of decoys that would be deployed to try to fool us. An ICBM attack would not come as a single object (that would be too easy), but as a "cloud" of objects—only one being the real thing.

Discriminating is done in many ways. Determining trajectory is one. Measuring its size is another. If the object is the size of a cigarette lighter, it is probably not a warhead; if the size of an office desk, it probably is. MAR then looks to see if the object is tumbling. If it is, it would burn up on entering the atmosphere. Another discrimination factor is the rate of slowdown. If the slowdown rate is very high, as with a balloon decoy or a blunt-nose object, then it probably is not a warhead.

***Ground command.*** Once MAR has made up its calculator mind that it has an enemy in its electronic sight, the job is turned over to MSR. This missile-site radar locks on the object, continues tracking it, and, when a Zeus or Sprint is launched, guides it on its intercept course to destroy the warhead target—on ground command.

Both MAR and MSR buildings are more than two-thirds underground, so they could still function in case of a near miss by an ICBM that got through.

Each Nike-X installation will have a battery of Zeus and Sprint missiles. The radars can handle the identification and tracking of several ICBMs at a time.

One MAR can control several MSR sites if necessary, and an MSR site can continue limited operation by itself if its MAR brain is knocked out of commission.

Pentagon planners, fearing that the $25-billion price tag for Nike-X will defeat them, are figuring ways to cut the cost—to perhaps $10 billion to give us good nationwide protection against "primitive" (communist China) missiles and tight protection for 10 big cities.

One factor favoring this is a technological breakthrough that will double the range of the present Zeus missile—to about 400 miles. This will enable one Nike-X site to extend its protective umbrella over a much larger area. Also, the missile can carry a bigger warhead without exposing Americans to heavy nuclear fallout. This bigger nuclear warhead will give Zeus a greater chance of destroying an ICBM in space.

***Locking the front door.*** Aside from the price-tag obstacle, there are other hurdles for the Nike-X to clear. To the Russians, say opponents, our building an anti-missile missile system could mean that we are getting ready to launch a massive ICBM attack on the Soviet Union. Not so, say the proponents. Locking your front door doesn't mean that you are a thief, taking judo lessons doesn't mean that you are going to pick a fight. The Russians, they say, have sense enough to know this.

Another argument for setting up an anti-missile missile defense: There are reports that the Russians are building such a defense system across the northeastern part of the USSR.

But whatever the arguments, price or policy, the urgency for an anti-missile missile defense is breathing down our necks. The "nuclear club" is growing. The U.S. spokesman at the Geneva nuclear-arms conference said recently that at least 20 countries have the capability of developing nuclear weapons and the means of air delivery—the so-called Nth countries. And the technique of launching nuclear missiles from submarines, pioneered by our Polaris, adds to the threat. The Russians say they, too, have this ability; and China is in there pitching. ■■

# These Weldwood® products make your home more weatherproof than Noah's ark.

1. P.A.R.®, a penetrating water repellent exterior stain that cannot blister, peel, crack or craze. Perfect for shakes and siding. Clear or a variety of colors.

2. Patiolife®, the satin redwood-tone sealer-finish for porch and patio furniture. Guards against chalky rub-off, warping, swelling, cracking or discoloration.

3. Woodlife®, the original water repellent preservative for wood. Penetrates and protects fences, outdoor furniture, siding against moisture, rot, insects and decay. An ideal base for paint. In clear or green for marine use.

4. Rainchek®, for brick, stone, masonry and asbestos. It is completely clear, colorless and odorless when dry. It repels water, and resists age, acids, salt air, direct sunlight and heat.

## Only United States Plywood makes Weldwood preservatives.

UNITED STATES PLYWOOD, 777 Third Avenue, New York, N.Y. 10017

For every man's Dream Workshop!

YOUR CHOICE $19.88 EACH

NEW 14-PIECE 3/8" DRILL KIT

The perfect gift for the handyman. Features a full-capacity 3/8" drill plus 3 drill bits, wire wheel brush, grinding wheel, 3 sanding discs, rubber backing pad, wheel arbor, chuck key and holder. Packaged in custom-fitted carrying case. (Model U-125)

NEW 16-PIECE JIG SAW KIT

An indispensable cut-up in a carrying case. This fine power tool is seven saws in one; a "dream" for any workshop. Kit includes Jig Saw, 12 blades, wrench, wrench holder and custom-fitted carrying case. (Model U-153K)

ORBITAL ACTION SANDER

Finish wood surfaces flawlessly with this compact, dependable sander. Sands flush to walls, removes paint, buffs. "Orbital action" to sand with or against the grain. (Model U-140) "Your Choice" power tools are available at all Black & Decker dealers.

expect the best from Black & Decker POWER TOOLS

Dept. D-105, Towson, Md. 21204

Enter the Black & Decker DREAM WORKSHOP SWEEPSTAKES 1150 Fabulous Prizes See your dealer for entry forms


[Continued from page 91]

was no organized rescue team anywhere. We decided on the spot to form one."

Today, the team—two squads of six men each—is an official unit of the National Capital Grotto. Three of the team are expert scuba divers trained in underwater rescue work; all members are thoroughly drilled in advanced first aid. Team members keep their gear packed in kits, ready to go at a moment's notice. Other equipment is carried in a light truck. Air Force jets ferry teams to distant emergencies.

## Rules for Safe Caving

Caving is safe provided certain safety rules are followed. The National Speleological Society suggests that you keep the following in mind:

1. Never go caving alone.
2. Carry three independent light sources with you—for example, a carbide lamp, a flashlight, and candles.
3. Leave a note inside your car window telling who you are, how many are in your party, what cave you went into, and when you expect to be out.
4. Always make descents tied to a safety rope payed out by a companion.
5. Never explore unfamiliar passages without unrolling a tracer line of heavy twine behind you.

***A narrow escape.*** The Rescue Team met its first big test last February 13, when James Mitchell, a 23-year-old caver, and two friends were exploring a cave, called Schroeder's Pants, near Dolgeville, N.Y. The trio lowered themselves into the entrance and crawled 75 feet through muddy passageways, at times no larger than a car's steering wheel, to reach a room the size of a closet.

An eight-foot belly crawl in one corner led to a smaller chamber with a hole in its floor that looked down into a 60-foot-deep cavern. An icy stream cascaded through the two rooms and down into the cavern. Mitchell erected a tripod over the hole, a cleft two feet wide and three long, and dropped a rope. Then, using Prusiks (short ropes tied to the main rope with slip knots that can be slid up or down) for stirrups, he lowered himself 20 feet to explore a ledge jutting out from the cave's side.

Starting back up, Mitchell got stuck 15 feet from the top. "The water was pouring over him," Karras explains. "His hands be-



Urheberrechtlich geschütztes Material

came numb and he couldn't budge the Prusiks." His friends tried to pull him up with no success, and finally went for help after he lost consciousness. The rescue team arrived in the early hours of Sunday morning, after the Dolgeville Fire Department failed in an attempt to lift Mitchell out.

"Mitchell was snow white when we saw him, and we knew he couldn't aid us," relates Karras. "We tried to raise him once, but it couldn't be done."

Karras and John Sanders then *lowered* Mitchell 45 feet to the cave floor, something no one had thought of, and followed him down. When they examined Mitchell with an electronic stethoscope, he was dead.

Because the body could not be pulled through the cave's narrow passageways, a drilling rig was set up to drill down into the pit area from the surface. Thydony and Douglas Bradford went down to check on the drill's entry point, photograph Mitchell, and bring up his personal belongings.

The two were getting ready to drop into the cave when suddenly they heard a series of low-pitched rumbles. Thinking it was the machinery on the surface, they called to Sanders through the belly crawl to have it stopped. Sanders passed the message to Karras through a telephone.

On the surface, Karras looked around. There wasn't a piece of heavy equipment moving. "Tell them to get the hell out of there!" Karras yelled into the phone. "The cave's starting to collapse!"

Bradford and Thydony scrambled through the narrow tunnel, Bradford leading. Just as Thydony's chest emerged, a section of the cave collapsed into the deep pit below. Thydony's legs, still in the crawlway, were hit by rocks, causing minor abrasions.

"A minute later," remarks Karras, "and we'd have had three dead men in that cave." Fearing more cave-ins, the state gave Karras permission to seal up the cave —and Mitchell's body—with dynamite.

***The tough ones—under water.*** While the threat of falling rock is always present, Karras holds that water-filled caves—which make scuba diving necessary—are the most hazardous. "Many caves flood a bit after a rainfall," he says. "A sudden cloudburst could fill the whole system while you're trying to get somebody out."

The rescue team was faced with such a possibility early last April, when four cavers entered Rowland Cave in Stone County,

CONTINUED


For every man's Dream Workshop!

NEW Black & Decker® VARIABLE SPEED DRILLS AND KIT

**YOUR FINGER CONTROLS THE EXACT SPEED NEEDED FOR EVERY JOB.** The harder you squeeze the trigger, the faster it runs. Use slower speeds to start holes without skipping, or drill tile, or mix paint. Medium speeds for drilling metal and plastic. Fast speeds for drilling wood and powering accessories. No skipping or stalling! The Black & Decker exclusive Variable Speed Switch is built to space-age standards to eliminate erratic operation common to other make speed control drills. Geared rheostat switch for non-skip power. Solid state circuits and rectifier. Giant-size heat dissipator for cooler operation. Tested for over 50,000 cycles.

**¼" DELUXE VARIABLE SPEED DRILL**
Any speed from 0 to 2250 rpm. U-205..... $26.88

**⅜" DELUXE VARIABLE SPEED DRILL**
Any speed from 0 to 1000 rpm. U-225..... $31.88

**¼" Del. VARIABLE SPEED DRILL KIT**
28 Pieces incl. U-205 ¼" Drill. U-213..... $31.88

B-D
expect the best from
Black & Decker®
POWER TOOLS
Dept. P-105, Towson, Md. 21204

Enter the Black & Decker
DREAM WORKSHOP SWEEPSTAKES
1150 Fabulous Prizes
See your dealer for entry forms




Urheberrechtlich geschütztes Material

Regular pipe tobacco brown pack

Pack more pleasure per pipe with this rich, full-bodied, fragrant Cavendish. Cool and slow-burning. Still only 40¢ a pouch. Amphora also comes Mild Aromatic (Blue) and Full Aromatic (Red). Blended and packed in Holland by Douwe Egberts Koninklijke Tabaksfabriek.

SPECIAL OFFER: Imported Stainless Steel 3-in-1 knife-style pipe tool plus pouch of AMPHORA: $1.00. Mail to Romick's, Int'l., Inc. Dept. C, P.O. Box 3033, North Hollywood, Calif.

**Build This Beautiful Grandfather Clock**

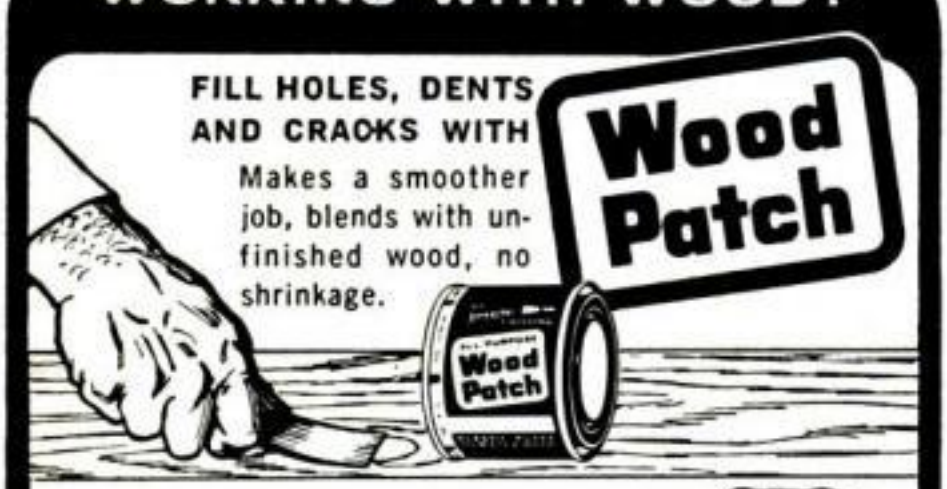
We show you how at price you can afford. Send only $1.00 for complete plans and instructions plus catalog of clock movements, dials, blueprints and kits for constructing Grandfather, Grandmother, Terry and other fine clocks.

**MASON & SULLIVAN CO.**
DEPT. PS OSTERVILLE, MASS.

**WORKING WITH WOOD?**

FILL HOLES, DENTS AND CRACKS WITH **Wood Patch**

Makes a smoother job, blends with unfinished wood, no shrinkage.




**Putty Stik** PATENT PENDING ®

Fills Nail Holes and Blemishes

Save finishing time apply prefinished paneling . . . set nails . and putty last. Choice of 35 wood colors.

At Your Dealer, or Write

FIC FOREST INTERIORS CORP.
P O Box 1848, SEATTLE, WASH 98111


### Rescued from 200 Feet Underground

Ark., to explore a newly discovered passage. When they didn't return, and searchers found that rain had flooded the cave's main passageway, the team was called in.

Two divers threaded a guide rope through the flooded passageway, then surfaced in an open chamber where the four trapped, shivering men were found. An extra scuba outfit was secured, and the foursome was given instruction on how to use it. Then, one experienced diver in front, one behind, each man plunged, in turn, into the water. Guided by the rope, they swam through the flooded tunnel to high ground near the entrance. By afternoon of the next day, all four were gulping down hot coffee outside the cave.

Karras and other members of the team are ardent cavers, but they are well aware of the hazards. "Caving isn't a dangerous sport," Karras remarks, "but it's growing fast, and many people just don't take time to learn the rules."

Unquestionably, Karras and his team have done much to make the sport safer. ■■

### Tiny Computers Steer Mightiest Rockets

[Continued from page 95]

only 267 pounds and they occupy a combined volume of only 5½ cubic feet. Almost equally astounding, the two units use a total of only 438 watts, about a quarter as much power as a household electric iron.

But the savings in weight, volume, and power requirement are possibly exceeded in importance by the tremendous inherent reliability of solid-state computers. The Saturn V computer is being built against a specification for a reliability of no less than 25,000 hours' "mean time between failures," and there is every reason to believe that this will be excelled.

A trick greatly contributing to this phenomenal reliability is the generous use of "triple modular redundancy," in connection with so-called "majority-rule voter circuits":

In laying out the design for this computer, IBM identified seven vital functional sections that could cause catastrophic failure of the space vehicle—and where, therefore, computer failures could not be allowed to occur. Then they arranged the computer in such a way that all computational problems arising in these seven critical functional sections are handled simultaneously by sets of three

CONTINUED



Urheberrechtlich geschütztes Material

# IF YOU HAVE RUPTURE

## Get this *NEW FREE BOOK*

Tells how Rupture can be treated by a mild Non-Surgical method that is backed by a Life Time Certificate of Assurance. This treatment method has a long history of use and is recognized by Authorities today. Men and Women from all over the country have taken the Non-Surgical Treatment and reported it is effective. Why put up with wearing a griping, chafing, unsanitary truss?

Write today for this FREE BOOK. Tells How, explains Why more and more Rupture Sufferers are using Modern Non-Surgical Treatment Methods. Act Now. No Obligation.

**EXCELSIOR MEDICAL CLINIC**

**Dept. E6231** **Excelsior Springs, Mo.**

# ELECTRIC ARC WELDER $14.95!

**MAKE—REPAIR MOST ANYTHING MADE OF METAL!**

**LIFETIME BURNOUT GUARANTEE**—10 day money back trial! Works on 110 volt plug in 10 WAYS! WELDS, BRAZES, SOLDERS, CUTS, MELTS most ALL metals! HEATS, SOFTENS, LOOSENS, THAWS, BENDS, most ANYTHING. COMPLETE READY TO USE WITH face mask, clamps, arc torch, rod holder cables—and supply of welding, brazing carbon, solder rods, flux and ARC WELDING INSTRUCTION BOOK—Tells how YOU can use for CARS—HOME—FARM—SHOP—or FACTORY all 10 WAYS—NO EXPERIENCE NEEDED! **SEND ONLY $2.00** (cash, ck, M.O.) and pay postman $12.95 plus COD postage or send $14.95 for PP del. in USA. BEST WELDER FOR THE MONEY IN THE WORLD. FREE: EXTRA "Helpers" dark goggles if you order from this ad. Sold ONLY by

**MIDWAY WELDER** **Dept. DPS-10** **Kearney, Nebraska**

# STICKS TIGHT

## DURATITE® WHITE GLUE

The all-purpose glue for home, hobby and workshop. Mends wood, paper, plastic, fabric... most porous materials. Makes a strong, permanent bond. Dries fast, sets clear. Handy plastic squeeze bottle. Sold at leading hardware, building supply, paint and specialty stores.

**DAP** DAP INC., Dayton 31, Ohio
SUBSIDIARY OF *Plough, Inc.*

*4-power model C4 shown with Tip-Off Mount; 6-power model C6 similar except longer*

***new fun, new accuracy with your .22! try the all-new Model C4***

# WEAVER SCOPE®

*The light, compact Model C4 Weaver-Scope shows you a bright, magnified target, makes aiming faster and easier, shooting more accurate. For varmints, small game, targets, a dependable, precision-built Model C4 helps you see better, shoot better. Mount it in seconds, without tools, on any .22 rifle with a factory-grooved receiver. See both quality C Models at your dealer . . . C4 for $9.75, C6 for $12.50, including Tip-Off or N Mount.* ©1965 W. R. Weaver Co.

***NEW! CONSTANTLY-CENTERED RETICLE***

*always centered like this*

*never off-center like this*

***FREE!*** *full-color catalog showing all Weaver-Scopes*

*NAME* _____

*ADDRESS* _____

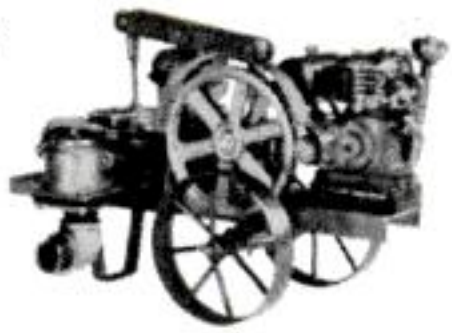
*CITY* _____ *STATE* _____ *ZIP* _____

***W. R. WEAVER CO.*** *DEPT. 102 / EL PASO, TEXAS 79915*

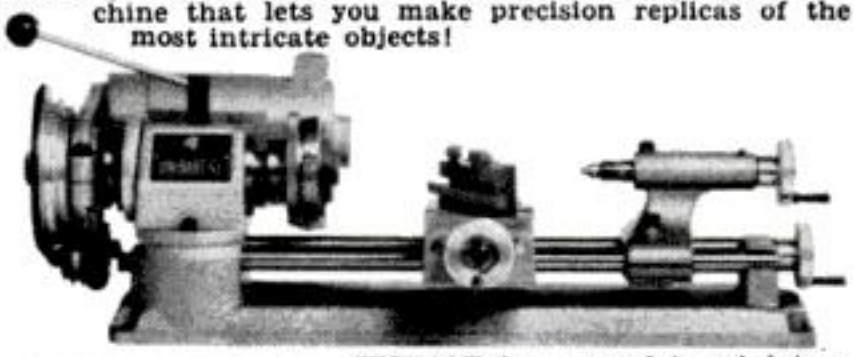


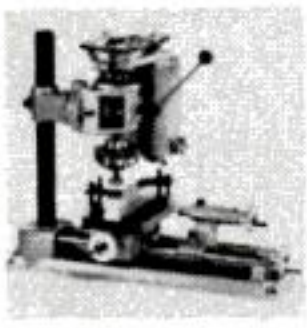
Urheberrechtlich geschütztes Material

**You can't buy a Mudhog. You can own the machine that made it!**



MUDHOG? A well-known pump used by the construction industry. UNIMAT? The world famous multi-purpose machine that lets you make precision replicas of the most intricate objects!





UNIMAT is a complete miniature machine shop only 16" long. Amazing versatility is the secret to its success. It's a precise lathe which in seconds converts to a vertical milling machine, drill press, surface grinder and more ready to go to work on anything made of metal, plastic or wood. Model railroad and slot car equipment, hobby gear, gas and steam engines, machine castings —UNIMAT'S many uses are limited only by the imagination!

UNIMAT operates with the accuracy of expensive toolroom equipment (.0005") at just a fraction of the cost. Basic UNIMAT sells for $139.50 and includes lots of extras. It's so easy to use...and takes up so little space. *No experience is necessary.*

To find out more about UNIMAT, just drop a card in the mail for free illustrated literature. To discover its *complete* personality, send $1.00 for "Miniature Machining Techniques"—a 40 page photo packed manual.

**American-Edelstaal, Inc., Dept. H-J5, 350 Broadway, N.Y.C. 10013.**

*Wash away* **oil and grease spots on concrete!**

New de-greaser quickly removes ugly surface grease from concrete driveways, carports, garage floors • Just apply, brush in with broom, flush clean with water • Also removes cooking oil stains from patios and hardened grease and oil from car engines, other mechanical equipment

***Klean-Strip's***

**DRIVEWAY CLEANER**

The Klean-Strip Co., Inc.—Memphis, Tenn.—Winnipeg, Man.

**SAVE ON Imported & Domestic WOOD**

CABINET HARDWARE - VENEERS - TOOLS

*EVERYTHING for the Wood Shop*

**New 1966 Catalog Ready!**

OVER 1500 ITEMS at MONEY SAVING PRICES! Finest domestic and imported hardwoods . . . all dimensions. Hardwood veneers. Power tools at discount prices. Hardware, lamp parts, upholstery supplies, mosaic tile. Hard to find inlays, bandings, etc. Get new catalog . . . send name, address and enclose 35¢ to pay postage, handling.

**CRAFTSMAN** WOOD SERVICE CO. **Dept. B-105**
2729 S. MARY ST., CHICAGO, ILL. 60608




exactly similar but independent logic modules, arranged in parallel.

***Majority vote decides.*** The independently derived results are channeled to majority-rule voter circuits that accept "A" as the correct answer as long as two out of the three modules present "A" as their answer. In other words, if one of the three parallel modules comes up with a different answer, it is outvoted by a majority of two to one. The probability of two modules making the same mistake is, of course, utterly remote.

The combination of speed, memory capacity, and reliability of the Saturn V guidance computer and its companion data adapter enables the two units to perform a number of functions that, just a few years ago, would have sounded fantastic. For instance, they provide so-called "path-adaptive guidance."

### Perfect Score

**To Dr. von Braun and the Marshall Space Flight Center that he heads, our congratulations for a phenomenal score: 10 brilliantly successful launches of the big 188-foot Saturn I rocket, out of 10 tries, in its just-concluded four-year test program.—*The Editors.***

***Choosing the best trajectory.*** Path-adaptive guidance means that as the big rocket climbs into orbit, the computer continuously compares the flight path with the optimum trajectory along which orbital injection may be attained with a minimum expenditure of propellants. It automatically corrects the flight path to follow this optimum trajectory. For example, should one of the five rocket engines of the second stage suddenly quit, the guidance computer would quickly take account of the loss in acceleration—and determine the optimum path to be flown under the power of the remaining four engines.

In addition, the two units help to perform prelaunch checkout, as well as checkout in parking orbit. During the prelaunch period, the computer can perform a self-test and a complete launch-vehicle mission simulation. In parking orbit, it is used not only to recheck the guidance-and-control system, but also the propulsion system of the Saturn V's third stage. In this manner it helps to make certain that the entire space vehicle, after ascending to orbit, is still in perfect condition—so that the Apollo astronauts can safely commit themselves to continue their voyage to the moon. ■■



Urheberrechtlich geschütztes Material

# Shrinks Hemorrhoids New Way Without Surgery Stops Itch – Relieves Pain

For the first time science has found a new healing substance with the astonishing ability to shrink hemorrhoids and to relieve pain — without surgery.

In case after case, while gently relieving pain, actual reduction (shrinkage) took place.

Most amazing of all — results were so thorough that sufferers made astonishing statements like "Piles have ceased to be a problem!"

The secret is a new healing substance (Bio-Dyne®)—discovery of a world-famous research institute.

This substance is now available in *suppository* or *ointment form* under the name *Preparation H®*. Ask for it at all drug counters.

# JEEP OWNERS

**Re-Power NOW with a V-8 or 6 Cyl engine—Use**

Ford - Chev - Mercury - GMC - Pont - Stude - Dodge or Plymouth in Jeeps, Jeepsters, Sta-Wgn, Trucks, Kaiser & H. J. cars. Conversion kits $45.35 to $56.90. Want fast action? Give us full information, send $15.00 Dep. and we will ship correct kit. Bal. COD. Send full amount for prepaid shipment. Wire, phone or write today. Details FREE.

**HOOSIER MACHINE PRODUCTS CO.**

314 S.E. 6th St. Phone 276-3442 Pend e en, Oregon

**KIDS!**

Learn how you can buy used engines $15 up, new engines $30 with FREE confidential list and coupons when you order your plans

- **BUILD THIS MINI-BIKE!** Plans reveal step by step details!
- **BUILD A RACING KART!** Complete frame for less than $10!

*RUSH $2 for plans (indicate type) or send 10¢ for brochure describing plans:*
PLANS, Box 478, Dept.PS-10,Denver, Colo.

SAFE PERSONAL PROTECTION

**THUGS AND ATTACKERS INSTANTLY WITH *Hagen's***

# TEAR GAS PENCIL!

**SELLS EASY TO DRIVE-INS, STORES, HOMES, NURSES, MOTORISTS, NIGHT WORKERS!**

New big demand. Stops, incapacitates vicious assailants. No selling experience needed. Start now! Send $5.95 for complete Demonstration Kit of Tear Gas Pencil, 10 Demonstration Blanks and 3 Tear Gas Cartridges.

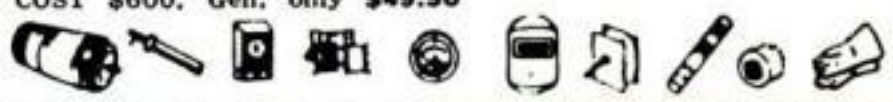
Not sold to minors, nor in Mich., N.Y., Calif., Wis. State age with order.

**HAGEN SUPPLY CORP., Dept. P-105 St. Paul, Minn. 55101**

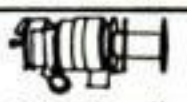
# GOVT. SURPLUS AND OTHER BARGAINS SAVE UP TO 90%

**DC JET GENERATOR ARC WELDING KIT** Complete with GE Type CM Generator (30 volts D.C., 400 Amp., 3000 RPM: ampere rating is for continuous duty, intermittent amperage is 500 to 600 amps). Also 2 rheostats, 1 voltage reg., 1 voltmeter, 1 electrode holder, 1 welder's mask, 1 toggle switch, 10 lb. vacuum packed 1/8 in. welding rods, pair welder's gloves & spline coupling. All units guaranteed pre-tested. Wt. 110 lbs. Approx. GOV'T COST $700. All items, **$64.50**

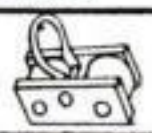
*GE GENERATOR noted above can be purchased separately. Makes deluxe heavy-duty welder comparable to the finest commercial welders available. Wt. 90 lbs. Approx. GOV'T COST $600. Gen. only **$49.50**



**ELECTRIC STORAGE BATTERY WINCH**



For use on 12 V.D.C. Heavy-duty ball bearing constuction 160-1 gear reduction. Reversible spool will handle 80′ of 1/4″ cable. 2000 lb. capacity. Ready to install & operate. 19″ L x 9″ W x 8″ H. Excellent for jeeps, trucks, boats, etc. Complete with mounting bracket. Shpg. wt. 60 lbs. Approx. GOV'T COST $400. New Model E. 90-day guarantee. **$59.50**



**HEAVY DUTY MAGNET** Fantastic power, will pull 125 lbs. on steel block. Excellent as underwater retriever. Picks up all ferrous metals. Dim. 4″ x 2″ x 1¾″. **$7.95.**

**NEW! BIG! 1965 CATALOG**

Send 25c (no stamps please) for copy of amazing catalog with 1000's of bargains in hydraulics, electric precision tools, marine & automotive items, etc. for hobbyist or industry. Order from this ad. All prices FOB Culver City, Calif. 50% deposit for COD. Send check, cash or money order in confidence — we've been satisfying mail order customers throughout the world since 1945.

**AIRBORNE SALES CO.** PS1065

8501 Stellar Drive • Culver City, Calif., Box 2727

# GEM MAKING KITS

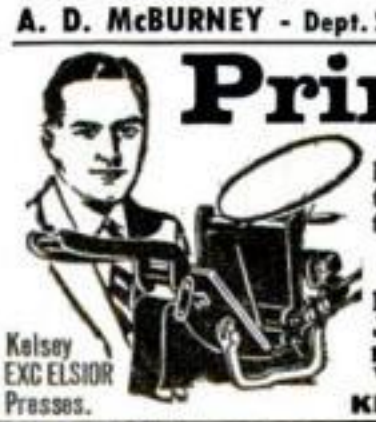
**MODEL A** (not shown)
Complete Gem Making Kit for the beginner • $37.50 ppd. accessories included.
Write for literature:

**NEW! Combination CABOCHON UNIT #63**

It saws-grinds-sands-polishes
Delivers complete with:
1-6" Diamond Saw Blade
1-6" 100 grit grinding wheel
1-6" 220 grit grinding wheel
1-6" felt polishing buff
1-pulley . . . oilite bearings
**$77.25 ppd. less motor • includes belt. Nothing on market like it • at near its low price.**

**A. D. McBURNEY - Dept. S105, 1610 Victory Blvd., Glendale, Calif. 91201**

# Print Your Own




Cards, Stationery, Advertising, Circulars, labels, photo and movie titles, church work, tags, etc. Save money. Sold direct from factory only. Raised printing like engraving, too.

**Own a Printing Business**

Print for Others, Good Profit. Have home shop. Junior press $15; Senior $35up. We supply everything. Easy rules. Pays for self in short time. Write now for free details.

**KELSEY PRESSES, Z-33, Meriden, Conn.**

**END OF AN ERA**

# "JOHN F. KENNEDY" 1964 P-MINT SETS

*Last Of The Silver Coins As We Have Known Them — Unconditionally Guaranteed*

The silver coins we have known will no longer be minted . . . the silver in the Kennedy half dollar reduced to 40%, no silver at all in quarters and dimes. We still have brilliant, uncirculated 1964 Sets, in sparkling plastic holders.

**BIG STATE COIN CO. (Dept. X8) • 1416 Commerce St. • Dallas 1, Texas**

**2.95** 10 SETS 27.50 postpaid

*Please send me ____ '64-P mint sets*

NAME_____

STREET_____

CITY_____

STATE_____

☐ CHECK ☐ M.O. ☐ C.O.D.



Urheberrechtlich geschütztes Material

original HANDEE® the ideal gift
TOOL OF 1001 USES

cut, carve, sand, saw, grind, drill, engrave, polish, clean

Tool of 1001 uses with sufficient power to do the job. Weighs only 14 oz. Smooth, cool operation. 28,000 R.P.M. Fully guaranteed against defects in material and workmanship. 110-120 volt AC/DC. Also available in 220-250 volt AC/DC at no additional cost. Manufactured and constantly improved since 1933.

**No. 6000 Handee Grinder** with 3/32" collet, 1/8" collet, and wrench. **$25.95**

**No. 6009 Handee Grinder** with 7 accessories ..... **$26.95**

**No. 6010 Handee Grinder** with 45 accessories and case..... **$35.95**

Full line of accessories listed in Handee Catalog.

ORDER NOW!

See your Handee Dealer or Order direct

CHICAGO WHEEL & MFG. CO.
Dept. PS-10, 1101 W. Monroe Street, Chicago, Illinois 60607

☐ Enclosed is payment for set No.....
(add 60¢ to cost of each set for postage and handling).

☐ Please send me Handee catalog.

NAME.....

STREET.....

CITY.....STATE..... ZIP CODE.....

Liquid WRENCH
LOOSENS RUSTED NUTS, BOLTS, PARTS IN SECONDS
at Service Stations, Auto and Hardware Stores

NEW DYNAMIC MARK 88
INDUSTRIAL TRANSFORMER ARC WELDER

ANYONE CAN WELD, BRAZE, CUT, SOLDER, HEAT ON STEEL, BRASS, ALUMINUM, AND OTHER METALS.

Build and repair anything of metal. Tremendous time and money saver. **THIS IS ALL BRAND NEW, PROFESSIONAL ARC WELDER!** Rugged metal cabinet, baked Hammerloid finish, ideal for home, shop, farm and industrial use. Expert work on your FIRST job. POWERFUL glass insulated transformer welds ½" metals with ⅛" rods. 4 heat settings, 20 to 80 amps. Operates on 110 Volt AC house line fused for 30 amps. Complete, ready-to-use—full head shield, electrode holder, ground clamp, cables, solder, assorted rods and simplified welding manual. Double-protection guarantee: 10-day money-back trial plus full 5-year warranty on materials and workmanship. **Order today: ONLY $47.50 (220V at $49.50).**

SEND ONLY $6.00

Only $47.50 Complete. Send only $6.00. Pay balance plus C.O.D. charges on delivery.
EASY PAY PLAN. Write for easy pay plan. LOW down payment, pay as you weld and earn.
*Welder Details FREE*

DYNAMIC WELDER CO.
DEPT. D3-K
1808 S. FEDERAL ST.
CHICAGO, ILL. 60616


[Continued from page 152]

little air circulation. The general treatment is to provide good air circulation and insulate against dampness. To kill the spores, use a mildewcide on the walls and woodwork. An ordinary household bleach like Clorox is highly effective.

**7** ***Is there an effective way to eliminate ants from our floors?***

Try to track down the nest. (Set out a few ant traps and you can often follow their trail.) Spray the occupants thoroughly with a strong ant killer. Remove all you can with a vacuum cleaner and empty what you've garnered into a paper bag. Then burn the bag.

This is just one question among many asking for help in getting rid of all types of insect and animal pests, particularly in new homes, long open to nesting. There are exterminating services in just about every city and town. And just about anyone you ask probably has his own favorite anti-pest system, which makes him an authority. So you'll never lack for competent free advice, regardless of the type of pest!

That winds up my list of America's "Top 7" home-repair headaches. But other ailments aren't far behind in unpopularity—squeaky floors and stairs, drafty floors, stains of all kinds, nonheating radiators, nondrawing fireplaces, to mention a few.

But whatever the problem, one piece of advice is always the same: In every case, it pays you to make the repair as soon as possible. By taking care of it, or having it done for you, you protect your investment in your home. And by doing the job promptly, you can often prevent a small problem from turning into an extensive—and expensive—amount of damage. It's worth remembering that the dollars you save on these repairs are your own! ■■



Urheberrechtlich geschütztes Material

## Model Dream Cars Build Dream Careers

[Continued from page 172]

look like metal, most of the cars are made of wood—bass, poplar, ponderosa and pattern pines. Some boys use a nonshrinking clay or fiberglass for their models. The dream cars are given their metal-like luster with up to 15 coats of undercoating and paint, with plenty of sanding in between.

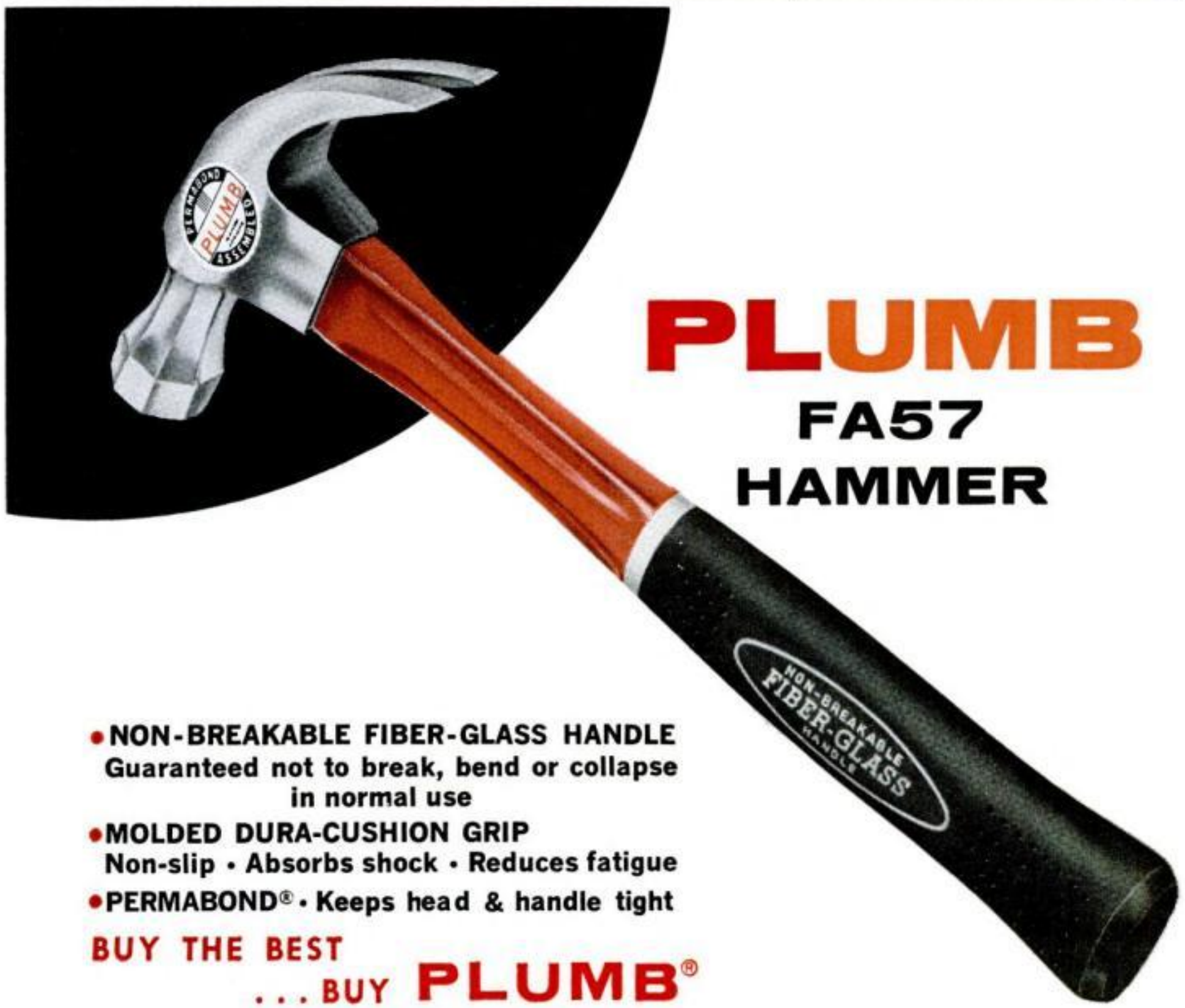
***What it takes.*** The average model calls for about 400 hours of work, but exceptional ones can take up to 1,000 painstaking hours. The cost ranges between $15 and $25. The biggest outlay is usually for paint.

Among the most interested spectators during the judging are professional designers. Charles Mason, a designer for GM, and winner of a runner-up award back in 1954, was a judge last July.

There, too, was Charles M. Jordan, GM executive in charge of styling. Winner of a $4,000 scholarship himself in 1947, he believes the Guild competition is terrific preparation for a design career. Remarking on the growing opportunities in styling, he revealed that between 1959 and 1965, the number of body styles at General Motors alone rose from 71 to 151, and trim combinations increased from 388 to 841.

The same trend is found in the marketing of TV sets, refrigerators, and countless other products. Consumers are demanding an ever-widening number of styles to choose from, opening doors to more designers.

What will the auto designers of the future produce? Jordan predicts, "There will be a lot more opportunity to design specialized cars—city cars for women, sportier sports cars, and high-speed autos with interiors specially designed for long-distance travel." Sounds like plenty of work for young dreamers. ■ ■


PLUMB

FA57

HAMMER

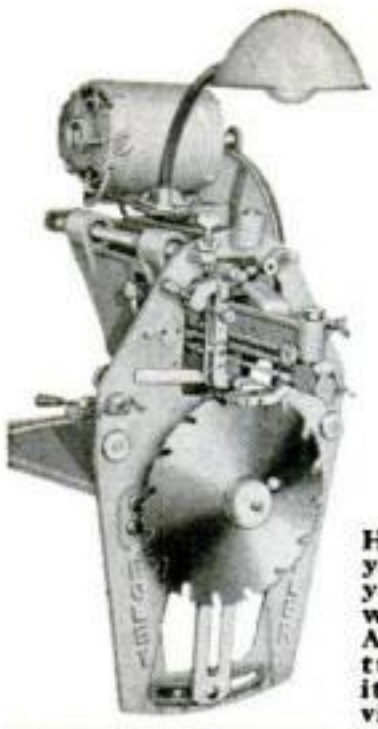
- NON-BREAKABLE FIBER-GLASS HANDLE
  Guaranteed not to break, bend or collapse in normal use
- MOLDED DURA-CUSHION GRIP
  Non-slip • Absorbs shock • Reduces fatigue
- PERMABOND® • Keeps head & handle tight

BUY THE BEST
...BUY PLUMB®

FAYETTE R. PLUMB, INCORPORATED • PHILADELPHIA, PA. 19137

211

Urheberrechtlich geschütztes Material



# EARN $3 TO $6 AN HOUR in sparetime

**Here's a practical way to increase your income and build security for your family. Earn extra money every week sharpening saws with a Foley Automatic Saw Filer. You can actually build your own business with it—without special training or previous experience.**

TURN YOUR SPARE TIME INTO CASH. Make from $3 to $6 an hour evenings, week-ends. Start in your basement or garage. No canvassing. *"I advertised in our local paper and got in 83 saws"—says M. L. Thompson.* Every saw you sharpen with the Foley Filer brings you more customers. Hundreds are making extra money this sure, fast, easy way. You can too.

**FREE BOOK SHOWS YOU HOW TO START**

**"Money Making Facts" explains how you can get business from home owners, farmers, carpenters, schools, factories, etc., how to build your business and expand—every step of the easy way. Don't wait. Mail coupon now for this exciting book and easy pay plan. No salesman will call.**

MAIL COUPON FOR FREE BOOK

FOLEY MANUFACTURING CO.
1049-5 Foley Bldg., Minneapolis, Minn. 55418
Rush free book, "MONEY MAKING FACTS", and details on easy pay plan.

Name_____
Address_____
City_____ State_____

# HOW TO FINISH WOOD

Get this 32-page full color book written by experts. Tells how to obtain professional finish on interior and exterior natural wood. Floors, wall paneling, antiques, boats, many more. Only 25 cents p.p. Send coin today.

**McCLOSKEY VARNISH COMPANY**
DEPT. PS 10, 7600 STATE RD., PHILADELPHIA 36, PA.

# BUILD YOUR OWN CAMPER AND SAVE!

**ALSO TRAILER OR PICKUP-COVER**

**Complete, easy to follow plans, instructions, material list.... $3.95 ea.**

**Bus Conversion and Houseboat interiors drawings..... $2.95**

**EQUIPMENT CATALOG—$1.00**
**(Refundable on first order)**

**Satisfaction Guaranteed! Send Check Or M.O.—For Details Send Dime.**

**VIKING CAMPER SUPPLY** 94-JD Glenwood Av., Minneapolis 3, Minn.

# DIRECT FROM SOURCE—BELOW WHOLESALE!

**ONLY $999**

# '65 FORD OR DODGE

| | |
|---|---|
| '64 DODGE | $699 |
| '64 FORD | $699 |
| '64 STUDEBAKER | $599 |

Formerly taxis, carefully maintained by Fleet Owners.
No taxi signs or markings.
No different than regular passenger cars.

**FREE!** GET THE EXCITING FACTS NOW! WRITE FOR ILLUSTRATED CATALOG AND ACTUAL PHOTOS TODAY!

Bank reference: TRUST COMPANY OF NEW JERSEY, 457 West Side Ave., Jersey City, N. J. 07304.

*CALL, WIRE, WRITE LARRY SHANDEL*
**Phone: Area Code 201 866-7500—N.Y.C.: 212 244-1580**

**UNIVERSAL AUTO WHOLESALERS INC.** Est. 1959
235-B Penhorn Ave., Secaucus, N. J. 07094
Only 10 minutes from N.Y. off U.S. 1 & 9

WORLD'S FINEST CORED SOLDER

# ERSIN MULTICORE 5-CORE SOLDER

BUY IT AT RADIO-TV PARTS STORES

EASY DISPENSER ONLY 69¢

# GENUINE ALNICO MAGNETS

***AMAZING, PERMANENT, NON-ELECTRIC, HIGHLY PRACTICAL***

Conduct interesting experiments. Hundreds of uses. Retrieve valuable steel items such as guns, tackle from fresh or salt water, tools from tanks and drains. GUARANTEED. Try any magnet one week. Money back if you are not well pleased.

| | | |
|---|---|---|
| **S-710** | (Wt. 53 oz.) Has pull of 225 lbs. on steel block.... | $18.50 |
| **S-625** | (Wt. 49 oz.) Has pull of 125 lbs. on steel block.... | $12.50 |
| **S-575** | (Wt. 18 oz.) Has pull of 75 lbs. on steel block.... | $ 7.50 |
| **S-500** | (Wt. 13 oz.) Has pull of 50 lbs. on steel block.... | $ 5.50 |
| **S- 90** | (Wt. 5 oz.) Has pull of 15 lbs. on steel block.... | $ 3.50 |
| **S-44** | Red Magnets for Electric Guitars ¼" DIA. x 1¼" 12 for | $ 4.00 |
| **S-300** | Kit of flat bars—5 pairs (10 magnets)..... | $ 3.00 |
| **S-47** | Hot pad magnets .....10 for $1.00..50 for | $ 4.87 |
| **S-35** | Science experimenter Kit of 8 magnets..... | $ 2.00 |

**SEND M.O. OR CHECK—WE PAY POSTAGE—SORRY NO C.O.D.'s**
**MIAMI MAGNET COMPANY, 3240 N.W. 27th Ave., Miami, Fla. 33142**

# Broken or Loose FALSE PLATE?

**Make Plates Like New**

## Fix it Yourself EASILY in a Few Minutes

**Your plates may become broken or loose just when you need them most With FIX IT KIT you can repair your own broken plates Also tightens loose fitting plates easily Get permanent comfort with professional material Complete instructions Satisfaction guaranteed or your money refunded *Order Now* at a new low price only $2.98 postpaid —**

**DENT-FIX DENTAL PRODUCTION, Dept 234, Box 674, Kansas City 41, Mo.**

**Money Back Guarantee** # HEAVY DUTY-ARC WELDER **Five Year Guarantee**

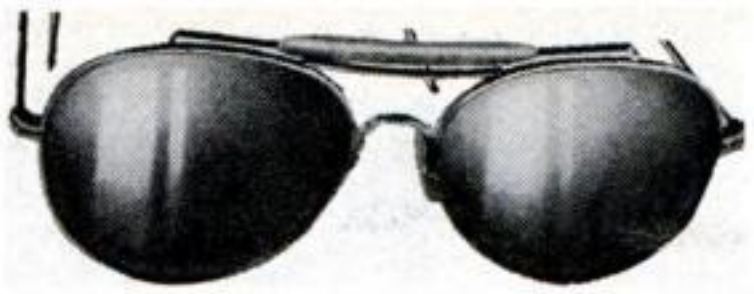
The New 1965 Model Heavy Duty 110 Volt Arc Welder works on any 110 volt house line. You can not buy a better welder anywhere at this low price. No experience necessary. Now anyone can braze, solder, cut and weld any metal up to ¼" thick. Generates heat up to 10,000 degrees for cutting through steel plate, etc. **NOTHING ELSE TO BUY.** Comes complete with 12 ft. of heavy duty power cable. 1/16" and ⅛" welding and brazing rods, rod holder, twin Carbon torch, helmet, instruction book, etc. **MONEY BACK GUARANTEE.** Try it for 10 days. If you are not completely satisfied we will immediately refund your money without question.—**FULLY GUARANTEED FOR FIVE YEARS.** If inoperative, we will repair or replace it free of charge. **SEND ONLY $2.00,** and when delivered, pay postman $12.95 plus COD postage, or send $14.95 and we will ship postpaid. Over 10,000 National Electric welders are in use throughout the world.

**ONLY $14.95**

**Order direct from factory: NATIONAL ELECTRIC, Dept. PS-10, DELRAY, FLORIDA**

Urheberrechtlich geschütztes Material

## For Your Favorite Sport



See MORE ACCURATELY and CLEARLY with LITENITE AMBER SPORT GLASSES that cut through HAZE and FOG. NOT ordinary glasses but unique AMBER lenses specially designed for TARGET PRACTICE, HUNTING, FISHING! See bullseye or game stand out so sharply and clearly—even though haze, fog, insufficient light obscure vision. AVOID ACCIDENTS by identifying moving objects. Perfect for NIGHT SPORTS, TV viewing, walking at night. Beautifully made with gold-finished frame, comfort temples, adjustable nosepads, wide-angle lenses. FREE! Rich-looking leatherette Carrying Case. Send check or money order or order COD plus postage. Money-back Guarantee. REGULAR STYLE only $2.98. CLIP-ON STYLE for use over prescription glasses only $2.25. DE LUXE STYLE with large silvery-finish frame $5.00. State STYLE and whether for MAN or WOMAN. STUYVESANT TRADING CO., Inc., Dept. 517, 130 West 42nd St., New York 36, N. Y.

SPRAY ON! WIPE OFF!

® MALCO

**Leather & Plastic Spray Cleaner**

- Quickly removes dirt, grease and grime
- Restores original appearance

*At service stations everywhere! For name of dealer nearest you, write:* **MALCO Products, Inc.**
Dept. P-10 Akron 4, Ohio

# 640 ACRES OF WILDLIFE-$20

For $20 a year plus $6 taxes you can lease a 640 acre wildlife domain near Canadian border. Untamed paradises! (Abandoned timber leaselands.) Extensive choice of these exclusive lakeland campsites accessible by road, teeming with wildlife, including bear, moose, deer, muskie, northern pike, ducks, geese. Send $1 (refundable) for maps, pictures, Gov't. regulations, official application blank to: Director, O.S.C.A., Room 419, 56 Church, Toronto 1, Canada. Add 50c for rush air mail.

## To Make and Sell Ornamental Concrete Items

You Need **MOLDS**

For Thorough Info On Over 300 Different Molds You Can Buy And Use Plus Complete Start To Finish Professional Instructions

RUSH $2.00 for book

**TURN CONCRETE INTO GOLD**

CONCRETE MACHINERY COMPANY, INC.
839 Lenoir Rd. - P. O. Box 99 - Hickory 7, N. C.

# A New FREE BOOK for MEN PAST 40

## Troubled With Getting Up Nights, Pains in Back, Hips, Legs, Nervousness, Tiredness.

This new Free Book tells that if you are a victim of the above symptoms, the trouble may be traceable to Glandular Inflammation . . . a condition that very commonly occurs in men of middle age or past and is often accompanied by despondency, emotional upset and other mental and nervous reactions.

The book explains that, although many people mistakenly think surgery is the only answer to Glandular Inflammation, there is now a non-surgical treatment available.

## NON-SURGICAL TREATMENTS

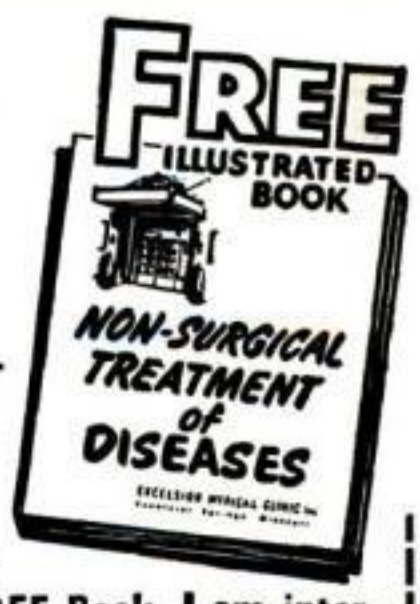
This New Free Illustrated Book tells about the modern, mild, Non-Surgical treatment for Glandular Inflammation and that the treatment is backed by a Lifetime Certificate of Assurance. Many men from all over the country have taken the NON-SURGICAL treatment and have reported it has proven effective.

The Non-Surgical treatment described in this book requires no painful surgery, hospitalization, anesthesia or long period of convalescence. Treatment takes but a short time and the cost is reasonable.

**REDUCIBLE HERNIA | HEMORRHOIDS**

**Non-Surgical treatment for both Reducible Hernia and Hemorrhoids, the book explains, can usually be taken at the same time as treatment for Glandular Inflammation.**

**This new Free Book is fully illustrated and deals with diseases peculiar to men and women. It tells HOW and WHY New Modern NON-SURGICAL Methods are so successful today. Fill Out Coupon.**




Excelsior Medical Clinic, Dept. M 6250
Excelsior Springs, Mo.

Gentlemen: Kindly send me at once, your New FREE Book. I am interested in full information. (Please Check Box)

☐ Glandular Inflammation ☐ Hernia ☐ Hemorrhoids

Name.....

Address.....

City.....State.....



Urheberrechtlich geschütztes Material

## BEST LOW COST ELECTRIC WELDER MONEY CAN BUY ONLY $14.95

**5-YEAR GUARANTEE**
**10-DAY MONEY BACK TRIAL. WELDS, BRAZES, SOLDERS, CUTS ANYTHING OF METAL**

No comparison for performance and value. No experience needed to make or repair auto bodies, fenders, trailers, boats, furniture, farm equipment, garden tools, anything of metal. Use up to 1/8-in. welding rods and 1/4-in. carbons on up to 1/4-in. metal. Operates on any 110 V. line. **WORLD'S GREATEST WELDING VALUE.** Over 500,000 in use by home owners, farmers, hobbyists, mechanics. **5-Year unconditional guarantee.** Order on 10-day moneyback trial, if not satisfied return for refund. LITERATURE FREE.

**SEND ONLY $2.00**

You Get: **FULL FACE SHIELD**, heavy metal cabinet, ground clamp, 12 ft. of heavy duty welding cables, twin carbon arc torch, rod holder, carbons, welding and brazing rods, flux, solder, instructions. **SEND ONLY $2.00.** Pay $12.95 plus C.O.D. charges on delivery or send only $14.95 and we will ship prepaid. Order today.

**FOUR-WAY WELDER CO.**
DEPT. W3-K, 1810 S. FEDERAL ST., CHICAGO, 60616

## CLOGGED SEWERS

**SAVE COSTLY PLUMBING REPAIR**

PATENTED CUTTERS CLEAN 1" TO 12" PIPE with Power

★ **FREE BOOK** Tells How To Clean All Drains

Valuable advice on removing Roots, Grease, Detergent, Rags in **TOILETS, SINKS, URINALS, BATHTUBS, SHOWERS, HOUSE-TO-STREET SEWERS.** Get rid of foul odors. Do your own rodding or start your own Business. Receive **FREE SKETCH** of Plumbing Pipeline in average Building. Save Plumbing Bills. Tear this ad out now and write your name and address beside it for helpful **FREE BOOK** on Power and Hand Units. No Agent will Call. (Chicago Phone Kildare 5-1702) **MILLER SEWER ROD, DEPT. PSR, 4642 N. CENTRAL AVE., CHICAGO, ILL. 60630.**

*Picture-Packed Catalog & Manual for*

## WOODWORKERS

GET YOURS! Benefit from newest products, latest methods, low prices. See everything you need to build, refinish, restore anything of wood. 200 woods. Hdwe. *Glue that needs no clamps!* Unsurpassed values! Send 25¢ toward mailing vast catalog. *Est. 1812.*

2,000 Products for Craftsmen Woods, Veneers Finishes, Tools Books & Plans Upholstery, Etc. 101 Project Ideas

**CONSTANTINE** 2050 Eastchester Rd., Bronx N.Y. 10461 Dept P-6

## SAVE UP TO 85% GOV'T SURPLUS and NEW EQUIP'T

Send 25¢ For 3 Big Catalogs

PUMPS
WELDERS
WINCHES
SURVEYING
TELEPHONES
HYDRAULICS
GENERATORS

ELECTRONIC
BINOCULARS
GEAR MOTORS
COMPRESSORS
SPEED REDUCERS
WEED SPRAYING
MANY OTHERS

**SURPLUS CENTER** Dept. PS-105 Lincoln, Nebraska

## AT LAST!

*The lathe you've been waiting for . . . at a price you can afford!*

Only **$69.95!** the METAL MASTER

"A precision-built bench lathe with powerful, positive drive . . . full 4¼" swing . . . all the features of a big lathe. Three models — 9½" to 28½" centers. Accessories never before available in this price range. Companion bench drill. *Send for Free literature.*

METAL MASTER **Metal Master Tool Company**
**Mt. Ephraim, N. J. 08059**

## Build BEAUTIFUL CLOCKS

Send just 25¢ for 1965 illustrated clock book—the most complete available, describing plans for grandmother, grandfather, wall and shelf clocks easily and inexpensively made with simple tools. Also pictured are a wide selection of finest dials, quality movements, and kits in high-grade cherry, mahogany and walnut.

**CRAFT PRODUCTS, Elmhurst, (2) Illinois**

## MAGNETS

Permanent—Alnico—Ceramic—Flexible—Assemblies For Industry—Schools—Advertising—Experimenter—etc. Rods—Horseshoes—Discs—Channels—Rings—Flat Bar—Square Bar. Supplied to your required size. Prices on request. WHAT YOU NEED, WE HAVE.

ASSORTED MAGNETS with big list of handy uses.....5 for $1
POWERFUL POCKET MAGNET ideal for testing metals.....$1
RETRIEVING MAGNET pulls tools, etc., from tank or lake. 100's of uses at home and shop. HIGH POWER.....$3
BULLETIN BOARD MAGNETS to "pin-up" memos .....8 for $1
SLENDER MAGNETS remove chips from drill holes.....2 for $1
FLEXIBLE MAGNETIC STRIP 1" x .060" per foot.....50¢
MARYLAND MAGNET CO., 5412-B Gist Avenue, Baltimore 15, Md.

## BASEMENT TOILET FLUSHES UP

*TO OVERHEAD SEWER OR SEPTIC TANK.*
NO DIGGING UP FLOORS. Write
**McPHERSON, INC. BOX 15133 TAMPA, FLA.**

## make your own Gems

**36.50** F.O.B.

The Gem Maker comes complete with all necessary equipment, including a super-charged diamond blade for sawing, and all the wheels for grinding, shaping and polishing; also complete instructions. The complete equipment as shown, less motor and belt for only $36.50, f.o.b., Burlington, Wisconsin. Write today for information and literature.

**B&I MANUFACTURING CO.**
Dept. S Burlington, Wis.

## PROTECT YOURSELF! TEAR GAS

NO PERMIT REQUIRED

**TEAR GAS GUN OUTFIT**

This all-steel, .22 cal. TEAR GAS gun shoots 6 times as fast as you can pull the trigger. Also fires blanks for alarm, or dog training, and flares for emergencies. Complete with 6 tear gas shells and instructions.

BLUE STEEL $9.98
CHROME 11.98

**TEAR GAS PENS**

This handy size chrome pen shoots the new powerful .38 spec. MAGNUM cartridge. Will halt an attacker – in his tracks, renders him helpless while you summon aid!
Complete with 2 shells $9.98
As above, two shot with 2 shells 11.98
.22 cal., single shot with 3 shells 4.98

☐Gun $9.98 ☐Gun $11.98 ☐Pen $4.98 ☐Pen $9.98 ☐Pen 2-Shot $11.98
☐Holster $2 ☐.38 Shells Ea. .99¢ ☐.22 Shells 10-$1.50 ☐Flares 6-$1.50 ☐Blanks 100-$1.50

ORDER NOW! Mark Items You Want. Send Check or Money Order to:
**TEAR GAS DEVICES CO.** 136 Madison Ave., St. Louis, Mo. 63122
Pre-Paid in U. P. S. areas. Others Express Collect (No C. O. D.'s)



Urheberrechtlich geschütztes Material

POPULAR SCIENCE MONTHLY
355 Lexington Ave., New York, N. Y. 10017

# MAIL ORDER OPPORTUNITY MART

**Products — Services — Opportunities, both classified and display for Popular Science's more than 6,000,000 top-notch prospects.**

**CLASSIFIED ADS** $1.25 per word per insertion, payable in advance. Minimum ad, 10 words. $12.50. Advertisers using post office box number in ad must furnish complete name & street address for our records. Closing date for December issue (on sale Nov. 29th) is October 21st. No cancellations after October 15th. Send copy and remittance to O.K. Kelley, Classified Adv. Mgr.

**DISPLAY ADVERTISING** rates on request. Write % H.B. Fleischman.

## 2 AUTO SUPPLIES & EQUIPMENT

**AUTO** welding repair training in world's largest non-profit welding school. Low tuition. Free booklet. Hobart Welding School, Box P-105, Troy, Ohio.

**AUTOMOVE** gas saver and power booster! Free details! H. Ohara, Pearl City, Hawaii.

**ANTIQUE** Car Pistons, Gaskets, Gears, Valves, Etc. Catalogue $1.00. Antique Auto Parts, Millwaukee, Wisconsin 53204.

**PARTS** Model "A." List 25c (Refundable) Matco, Box 135, San Pedro, Calif.

**IGNITION.** Delta's Patented Mark Ten Capacitive Discharge Ignition System, the world's largest selling SCR Ignition, fits all cars. Easy assembled kit $34.95, assembled $49.50. Acknowledged by engineers as the ultimate ignition system in feature articles in Popular Electronics, Electronics World, Electronics, and other engineering publications. Proven on thousands of cars, trucks, and boats. Connects to standard coil, no rewiring. Saves gas and 80% of ignition tuneups. Plugs last 5 times longer. Give you and your car a "treat," order your Mark Ten today. Satisfaction Guaranteed. Shipped postpaid. State Voltage & Polarity. Delta Products, Inc., P.O. Box 1147, Grand Junction, Colorado.

**CROSLEY** New, Used Parts. Box 7, Elmont, N. Y.

**FOREIGN** Car Parts, Discounts. Box 7, Elmont, N. Y.

**SPINNING,** Stuck, Stranded, Snow! Newly invented Snomat arches snugly against spinning wheel—out of snow you go. Moneyback guarantee. Prepare now. Send $1.50 (postpaid). Snomat, Box 617-B, Franklin, Michigan.

**OWNERS**—Corvair, MG-1100, Saab, Volkswagen; Superior traction, maneuverability makes your car ideally suited to snow-plowing. Plows. Specifically engineered for your car, complete with power lift-controls—Only $135.00. Attach—detach complete plow—lift unit in one minute. Give year, make car. Send 50%—balance COD. Damn Yankee Enterprises, Dept 22 PS, 46 Smith Street, Torrington, Connecticut.

**ELECTRONIC** Ignition. Only $9.95! Guaranteed! Inquire: Box 405N, Syosset, New York, 11791.

**ELECTRONIC** warning unit. Let's you know instantly when headlights are left on! $6.95. Hart Co., B47, 10900 Bustleton, Phila., Pa.

**EMERGENCY** Brake Failure? Install a Positive Hydraulic Emergency Brake. No special tools needed! Purchase all parts from local Automotive store. Send 25c for complete schematic and instructions. Bar-Betts Sales, 4304 North 37th Street, Omaha, Nebraska.

**JEEP** Parts Catalog! Military and Civilian. For owners, dealers, garages, service stations. Save $$$. Surplus and replacements. American Auto Parts Co., 1830 Locust, Kansas City, Missouri.

## USE THIS HANDY INDEX TO FIND WHAT YOU WANT


| | |
|---|---|
| Advertising, Agencies for Advertisers | 53 |
| Agents Wanted | 43 |
| Antiques, Relics & Indian Goods | 29 |
| Art Instruction, Cartooning, Sign Painting | 54 |
| Astronautics | 5A |
| Authors Service | 52 |
| Auto Supplies & Equipment | 2 |
| Auto Trailers | 3 |
| Aviation | 5 |
| Batteries, Generators, Etc. | 6 |
| Boats, Inboard & Outboard Motors | 11 |
| Body-Building Courses, Jiu Jitsu, Etc. | 12 |
| Books & Magazines | 23 |
| Business Opportunities | 37 |
| Business Service, Information, Name Lists | 50 |
| Buy It Wholesale | 38A |
| Camping Equipment & Tents | 16 |
| Coins & Currency | 26 |
| Contests | 46 |
| Detectives | 47 |
| Do-It-Yourself | 66 |
| Dogs, Birds, Hamsters & Pets | 17 |
| Earthworms, Crickets, Frogs | 18 |
| Educational & Instruction | 45 |
| Electric Trains | 64B |
| Electrical Supplies & Equipment | 7 |
| Employment Information | 42 |
| Engines, Motors, Etc. | 10 |
| Farms, Other Real Estate | 19 |
| Field Glasses, Telescopes | 14 |
| For Inventors | 60 |
| For Sale Miscellaneous | 71 |
| For the Home | 69 |
| Formulas, Plans, Etc. | 39 |
| Garden Supplies & Equipment | 10 |
| Gifts | 49 |
| Government Surplus | 11A |
| High-grade Salesmen | 44 |
| Hobbies, Collections | 31 |
| Home Craftsman | 65 |
| Inventions Wanted | 61 |
| Jokes, Games, Novelties, Etc. | 24 |
| Loans By Mail | 80B |
| Machinery, Tool Supplies, Etc. | 9 |
| Magic Tricks, Puzzles, Etc. | 25 |
| Minerals & Precious Stones | 30 |
| Miniatures | 31A |
| Miscellaneous | 79 |
| Models, Model Supplies | 64 |
| Moneymaking Opportunities | 38 |
| Motion Pictures & Color Slides | 33 |
| Motorcycles, Bicycles & Supplies | 4 |
| Musical Instruments and Song Writers | 35 |
| Of Interest To Women | 70 |
| Old Gold, Jewelry, Watches | 67 |
| Old Stamps Wanted | 27 |
| Personal | 80 |
| Phonograph Records | 35A |
| Photo Finishing, Photocopies, Etc. | 32 |
| Plastics | 40 |
| Printing, Multigraphing, Etc. | 57 |
| Printing Outfits, Supplies | 58 |
| Profitable Occupations | 22 |
| Radio, TV, Electronics, Hi-Fi | 36 |
| Razor Blades, Shavers | 74 |
| Remailing Service | 80A |
| Rubber Stamps & Office Supplies | 56 |
| Science & Chemistry | 41 |
| Special Services | 51 |
| Sporting Goods, Guns, Fishing Tackle, Etc. | 15 |
| Stamp Collecting | 28 |
| Tattooing Supplies | 75 |
| Tobacco & Pipes | 68 |
| Treasure Finders & Geiger Counters | 77 |
| Trees, Shrubs, Roots & Herbs | 20 |
| Wanted to Buy | 72 |
| Watch Repairing | 78 |
| Welding, Soldering | 8 |


**KEEP** your Child safe! Sleeps in perfect comfort and safety regardless of rough roads or speeds. Assemble your "Baby-Safe" hammock from easy followed directions. Illustrated Plans 35c. Dept. A-3, 4304 North 37th., Omaha, Nebraska.

SNO-DRIVES® Stabilizes Racing Cars on ice. To Win, **Proof you** need Sno-Drives® **for winter driving.** Install Sno-Drives® **under wheel** covers, can't be **seen. $10.95 Postpaid** moneyback guarantee. **Bateson's, 4408** Market, Wilmington, Delaware. Amaze others **this** winter.

**UNIQUE** Panel Mounting ignition indicator **$2.00** Postpaid. Q-Arc, Box 47876, Los Angeles, Calif. 90047.

## 3 AUTO TRAILERS AND SUPPLIES

**PICKUP** Campers, Pre-cut Kits. Blueprints Supplies Literature 10c. Comstock Trailers, Parsons 5, Kansas.

**PICKUP** Camper, Trailer Or Pickup-Cover—Build Yourself, Save! Complete plans $3.95 each. Bus Conversion (and Houseboat Interiors) Drawings $2.95. Equipment Catalog $1.00 (refundable). Satisfaction guaranteed. Details 10c. **Viking** Camper Supply, 94-J Glenwood, Minneapolis, Minn. 55403.

**TRAILERS:** All Kinds—Boat, Box or Camping. Also: All parts to build your own. Send 25c for catalog. Norjack, 610 S. 108th St., Milwaukee, Wisc.

## 4 MOTORCYCLES, BICYCLES

**RECONDITIONED** Motorcycle Motors. **Large** Stock. Indian, Cushman, Vespa, **Mustang,** Royal Enfield. Parts. Indian Motorcycle Sales, Kansas City, Missouri **64127.**

**CONVERT** Bicycle to Motorbike! Plans .... $1.00; Go-Byk Industries, Rothsay, Minnesota 56579.

**KART** $5, MoPed $15, Cushman Eagle $20, Minibike $17, Motorcycle $15, Scooter $10, less engines. Engines $3.50 up. Whizzer engine $5. Vespa scooter $30, Kart $25. (Mailorder Only.) Send 25c (35c For First Class Mailing) **for** Directory-Catalogue **Number 125.** Listing **these** and hundreds of **other bargains. Homebuilders** Parts, Plans **etc. Midget Motors Directory,** Athens, **Ohio.**

**MINI BIKE** plans $2.00. Irvin, 1509 N. 9th, Fresno, Calif. 93703.

**BANKRUPT** Motorcycle bargains, parts-discount. Shop manual covering all motorcycles $9 95. Bulletin 35c. Bunico, 146-10 Covington, Virginia. Phone: 965-9316.

**HONDA** 50 to 90-S **Big Bore** & Stroker **Kits.** Columbia Eng., **2105 E.** 37, L. A., **Calif.** 90058.

## 5 AVIATION

**FLY over** traffic with real homebuilt **helicopter. Hover. Uses** outboard motor, **automobile, motorcycle** parts. Explanations, **detailed drawings,** instructions, **$2.00. Helicopters, Box 1117,** Leesburg, Florida.



Urheberrechtlich geschütztes Material

WORLD Wide Publisher Distributor of Aviation Space Books. Free 48-page catalog Aero Publishers, 329 PS Aviation Rd., Fallbrook, Calif. 92028.

AIRBOAT—Snowplane propellers, plans, kits, supplies. Gauges, throttles, spark plugs, gas-pil hose, oil coolers, primers, wrenches, switches, Tachometers, propeller hubs, engine mounts, conversion parts, fittings. 125-190 Lycoming engines, manuals, gaskets, parts. Catalog 25c. Banks-Maxwell, Box 3301G, Ft. Worth, Texas 76105.

## 5A ASTRONAUTICS

ROCKETS: New Illustrated Catalogue 25c. Single and Multi-stage Kits, Cones, Engines, Launchers, Trackers. Technical Information, etc. Fast Service. Estes Industries, Penrose 32, Colorado.

BUILD an Electronic Flying Saucer detector. Plans, $1.00—R. Schmitt, 610 Walker St., Michigan City, Indiana 46360.

## 6 BATTERIES, GENERATORS, ETC.

COMPLETE Rebuilding Manuals! Batteries $3.00, Hydraulic Jacks $3.00. Refundable! Bayer Publications, 938 Betty Ave., Neenah, Wisconsin.

## 7 ELECTRICAL SUPPLIES & EQUIPMENT

ELECTROPLATING Equipment And Supplies Send $1, Refundable. For Formulas, Equipment Guide, Operating Data And Catalog. HBS Equipment Division, Dept. N7, 3543 East 16th, Los Angeles, Calif. 90023.

SUNBEAM Appliance Parts available—All Models—Send for exclusive parts list 25c. Major Appliance, 13106 Caine Ave., Cleveland, Ohio 44105.

ELECTRIC Vibrator Motor Kits, Conversion Units for Relaxation Chairs, etc. $12.50 each. R.S. Weik, R.D. #2, Lititz, Penna.

**NEW! SCR CAPACITIVE DISCHARGE**
***FURY XII***
**ELECTRONIC AUTO IGNITION SYSTEM**

- All Components Pre-tested
- 8 Amp Silicon Contr'd. Rectifier
- All Motorola Semiconductors
- Mylar Capacitors Throughout
- 2 Microfarad Storage Capacitors

Designed for quality—engineered for reliability! 5½"L, 3⅛"H, 3¾"D. ALL-DIODE TRIGGERING for proven reliability. All advantages of **capacitive discharge** PLUS **solid state** electronics! Provides SUPERIOR COLD STARTING ABILITY. Install in 10 minutes! In KIT form or FULLY ASSEMBLED. ORDER TODAY AND SAVE BIG MONEY!

| | |
|---|---|
| FURY XII DLX. KIT SHOWN | $39.95 |
| FURY XII DLX. MODEL—ASSEMBLED | 69.95 |
| MK Standard Model Kit | 29.95 |
| MK Standard Model Assembled | 49.95 |

MICRO-KITS CO., DEPT. PS465 P.O. BOX 495, 15547 So. Garfield Ave., Paramount, Calif. 90723

- ☐ I ENCL. $39.95 for FURY XII DELUXE KIT
- ☐ I ENCL. $69.95 for ASSEMBLED FURY XII
- ☐ I ENCL. $29.95 for MK STANDARD KIT
- ☐ I ENCL. $49.95 for ASSEMBLED MK SYSTEM
- ☐ PLEASE send FREE LITERATURE

NAME _____

ADDRESS _____

CITY _____ STATE _____

APPLIANCE Lamp, parts. Wholesale catalogue 25c. Seco. 112 South 20th Street, Birmingham, Alabama 35233.

## 8 WELDING, SOLDERING

HOMESHOP Welder. Welds, cuts, brazes. Complete outfit only $12.95. Guaranteed. Aqua-Jets Co., Florence, Kentucky.

**AERO-BIKE CONTROL STICK**

New aeronautical type balancing and steering accessory for bicycles. Fits any standard handlebar. Easily installed. Finest materials. Chrome plated. Complete for $3.35 postpaid in USA. Or send 10¢ postage for colorful explanatory brochure.

**Aero-Bike Products Co.**
**Box 342, Muskegon, Mich.**

**THOUSANDS OF EXCITING TOOL VALUES!**

Stanley, Millers Falls, Skil, Disston, Wiss, Dremel, Speedy Sprayers, Plumb, Porter, Channellock, Bonney, Herbrand, Helios, Kennedy Boxes, Huot, Vise Grip, Ridgid and many other Nationally Advertised brands of Tools & Supplies too numerous to mention.

**We Ship Coast To Coast At Prices Hard To Beat**

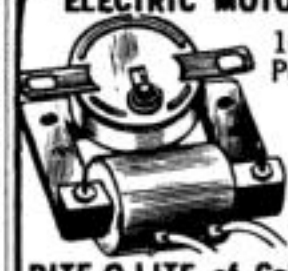
Send 25¢ today for our Big 148-page Tool Catalog. **SILVO HARDWARE CO., Dept. PSD, 107 Walnut St., Phila., Pa. 19106.**

Big Money-Maker for Handymen!
**HOLST Self-Aligning TOOTH SETTER**
**$22.50 ppd.** **QUICKLY ADJUSTABLE for ANY DEGREE of SET**

Fast, consistently accurate tooth for tooth. Ends guesswork of older methods. Life-time tempered steel dies and universal locking cone. Handles 4" to 20" blades. Steel plate construction. Moneyback guarantee. Pat. Pend.

**Holst Mfg. Co.** 3111 Cricklewood Ave., Torrance 1, Calif.

**ELECTRIC MOTORS 3 for $1.50!**



1000 uses for hobbyists! Power turntables, timers, kids' erector sets, model, etc. 4 rpm. 110 volt used. Pretested, money-back guarantee! $1.50 plus 50c pstg. & hdlg. (No C.O.D.'s)

**RITE-O-LITE of Calif., Inc.**
**308 E. Washington, Los Angeles 15, Calif**

**save money on**
**CARS & TRUCKS**
**LEARN HOW YOU CAN SAVE HUNDREDS OF DOLLARS THRU WHOLESALE TRADING POST!**

**FREE** at no obligation whatever, we'll send you full details of how you can buy any make or model car or truck; how easy financing & delivery to your door can be arranged; how you can actually save hundreds of dollars on exactly the same car you'd buy elsewhere.

NAME _____

STREET _____

CITY _____ STATE _____

Mail coupon now! Write: Dept. B 50

**WHOLESALE TRADING POST**
Great Neck, New York 11021

WELDER, Car Starter, Charger $49.50. Morris, 1070 Inner, Schenectady, New York 12303.

ACETYLENE Welding Outfits, New $69.50; Used $50.00; Arcwelders. Eagle Welding, Dept. 42, 5085 Broadway, Chicago, Illinois 60640.

## 9 MACHINERY, TOOL SUPPLIES, ETC.

BRONZE, aluminum foundries, 5 sizes. Free information. Pyramid, Box 65, Fayetteville, Arkansas.

"IMAGINE Circuit tester, screwdriver, measure, awl, hammer and saw all in one great combination tool. Send $2.95 T.M.I., Box 255, Dept.-A, Moorestown, N. J.

"SMALL Shop Supplies." Production-hobby. Machinist tools. 1424 Barclay, Springfield, Ohio 45505.

## 10 ENGINES, MOTORS, ETC.

REWIND Motors yourself. Complete instructions $1.00. Lewis Manufacturing, Howell 11, Michigan.

REWIND car generator for 110 V.A.C. power plant. Plans $1.00. R. Schmauss, 1228 E. Cass St., Tampa, Florida.

## 10C GARDEN SUPPLIES AND EQUIPMENT

WATERFALLS, Rapids, Fishpond. Illustrated Plans. $4.95. Brochure, Culver, Box 381, Downey, Calif.

## 11 BOATS, INBOARD & OUTBOARD MOTORS

BOAT Plans, frame kits, full size patterns all prepared specially for amateurs. Send 50c for new catalog illustrating 55 proven designs including sail, inboards and outboards from 7' to 28'. Glen Marine, 9152 Rosecrans, Bellflower, Calif.

"WORLD'S Largest Boat Plan and Full Size Pattern Catalog. Over 230 designs of every type. Power-Racing-Sailing. Send $1.50 for Plan Catalog. $2.00 for catalog plus Boat Building Handbook. Custom Boat Designs, 1709 Niagara St., Buffalo, New York 14207."

FULL size, cut-to-shape boat patterns, blueprints. Send 50c for big New illustrated "Build a Boat" catalog includes Fishing Boats, Garvies, Cruisers, Catamarans, Houseboats—Outboards, Inboards, Sailboats—7½ to 38'. "How to build a Boat" booklet $2.50. Cleveland Boat Blueprint Co., Box 18250, Cleveland, Ohio.

NEW, used, rebuilt marine motors. Marine conversions, fittings. Free Catalog. Stokes Marine Supply, Dept. 23, Coldwater, Mich.

"WORLD's finest Boat Kits! Frame Kits! Models from 8' to 24'. Prams-Skiffs-Runabouts-Cruisers. All leaders in styling and performance. Send 50c for catalog. $1.00 for catalog plus Boat Building Handbook. Custom Boat Designs. 1709 Niagara St., Buffalo, New York 14207."

SAVE hundreds of dollars. Build your boat engine with Star Marine kit. Big illustrated catalog tells how—50c refundable. Star Marine—Berkeley 10, Calif.

## 11A GOVERNMENT SURPLUS

JEEPS low as $53.90. Used. Buy one or more on bid from U.S. Gov't. Bidders information and our over 400 item (order by mail) Surplus Catalog. $1.00 (deductible on $10.00 order) Quality Surplus, Box 22038 (P10), Indianapolis, Indiana.

JEEPS from $53.90 . . . Trucks from $78.40 . . . Boats, Typewriters, Airplanes, Sporting Equipment. 100,000 Bargains "as is" Direct From Government in Your Area. Complete Sales Directory and Surplus Catalog $1.00 (Deductible First $10.00 Order). Surplus Service, Box 820-B, Holland, Michigan.

FREE War Surplus Catalog when you order our Surplus Directory: Jeeps $188, Airplanes $159, Boats $7.88, Generators $2.68; typical Government Sale prices when buying 10,001 Surplus items wholesale direct. Full details, 587 locations, procedure $1.00. Surplus, Box 789PS10, York, Pa.



Urheberrechtlich geschütztes Material

Scientific method builds

## Powerful Muscles

### in 3 minutes a day

An entirely new, tested method of muscle-building that combines isotonic and isometric contraction has been developed by physiologists at the famed Max Planck Institute in West Germany. The unique Tensolator method was successfully used to train the German Olympic team and other champion athletes all over the world. A quick series of 7-second exercises positively strengthens each set of muscles without tedious, strenuous workouts. 3 to 5 minutes a day is all it takes for maximum results (guaranteed or money back). The Tensolator method builds powerful muscles, broadens shoulders, trims waist, increases lung capacity. FREE lavishly illustrated, step-by-step brochure shows you how Tensolator works for men 20, 40, 50 years old or more. Send 20c for postage in coin or stamps to Dept. PS-1, Thoylo Corp., 509 Fifth Ave., New York, N.Y. 10017. (Christmas hint: Tensolator makes the gift of a lifetime!)

JEEPS Being sold at bargain prices by Government. For latest information regarding only 2 sale centers still open, send 25c to Government Surplus Jeeps, Box 177-PS10, Abbottstown, Penna.

WAR Surplus Bargain Catalogue. Illustrated, Generators, Blowers, Pumps, Gearboxes, Hydraulics, Winches, Motors, etc. Send 50c refundable on first order. Surplus Trader, Box 8PS-10, Thomasville, Penna.

GOVERNMENT Surplus. How and Where To Buy In Your Area. Send $1.00. PS Surplus Information, Headquarters Building, Washington 6, D.C.

INFORMATION Concerning "Buying Government Surplus." Send $1.00 to: Sic, Box 255, Fayetteville, Arkansas.

WAR Surplus Catalogue, Generators, Pumps, Gearboxes, Hydraulics, Winches, Motors. 25c stamps or coin, Trader, Box 8PS11, Thomasville, Pa.

GOVERNMENT Surplus. Complete Sales Directory $1.00. Surplus Publications, Box 45781P, Los Angeles 45, Calif.

## 12 BODY-BUILDING COURSES JIU JITSU & ATHLETIC EQUIPMENT

"GIANT Arms." Dr. Young's D. C. Revolutionary discovery, $2. Satisfaction or refund. Gaucho, Box 9309-S6, Chicago 90.

PHYSICAL perfection courses 25c. Guaranteed. Agents wanted. Sid's (PS-8-65), Southgate, California 90280.

KARATE—free details. Bales Co., Box 5050, Rt. 2, Escondido, Calif.

BUILD Muscles Fast! Free brochure! Universal Bodybuilding, Box 4327-B Northeastern, Dearborn, Michigan.

"BE A Champion Wrist Wrestler: Tear phone books, etc. Develop terrific power for gripping, crushing, bending, twisting, tearing, pulling with special equipment you can easily build yourself from odds & ends. Instructions & illustrations, 2 Dollars. Linder Enterprises, P. O. Box 319-B, Cherry Hill, N. J."

JUDO—Karate Supplies—Complete Catalogue largest dealer. Send 15c stamps to Judo America, 1090 Sansome Street, San Francisco, California 94118.

MUSCLE Development: proven results—illustrations, instructions $1.00 to: Self-Development, P.O. Box 18069, San Antonio, Texas.

## NEL-KING MAGNA-FI

### makes close work, fine print look big!

**FOR CRAFTSMEN, HOBBYISTS, TECHNICIANS, HOMEMAKERS...**

People of all ages! You see clearer, work faster and more accurately with less tension, less strain, less fatigue. MAGNA-FI is a precision optical instrument with finest ground and polished prismatic lenses. Can be worn with or without glasses . . . even bifocals. Adjusts comfortably to any head size. Leaves hands free to work. Only $7.95 postpaid with removable 2½ diopter lens. An extra, more powerful 3 diopter interchangeable lens available at $2.98 additional. **Exclusive Feature:** Hinged lens swings up out of the way when not in use. **GUARANTEED:** Money back if returned postpaid in 30 days. **Nel-King Products**
**Dept. PS-105MF • 811 Wyandotte • Kansas City, Mo.**

## SEW LEATHER

### AND TOUGH MATERIALS EASILY

**COMPLETE, EASY-TO-USE, HEAVY DUTY STITCHER KIT IN ONE COMPACT TOOL**

**1.98 Post Paid**

HEAVY DUTY STITCHER makes it easy to sew anything made of Leather, Canvas, Plastic, Nylon, or other tough materials. Fast "push-pull" action makes even lock-stitches like a machine. Saves you money repairing Luggage, Convertible Tops, Seat Covers, Sails, Sportsgear, Footwear, Saddlery, Awnings, Rugs, etc. Comes complete with 3 different needles fine, heavy, curved and 10 yard bobbin of strong, waxed Nylon thread, including simple directions. Extra needles and thread always available. ORDER NOW! Send only $1.98 money order, check, or cash. We pay postage. MONEY BACK GUARANTEE.

**SPORTSMAN'S POST, Dept. M-55**
**LAKE AVE. EXT., DANBURY, CONN.**

## Diving Watch

**17-Jewel Calendar**
**DIRECT FROM SWITZERLAND at a Fraction of U.S. Price!**

CHROME STEEL case with CALENDAR, ROTATING BEZEL, LUMINOUS figures, SHOCK-PROTECTED. Pressure tested at 500 ft. (with case, crown, crystal intact). Luxurious matching Stainless Steel Watch Band included. IMMEDIATE shipment via REGISTERED AIRMAIL. Send $12 in dollar bills, money order or bank check. (No personal checks.) Deluxe AUTOMATIC SELF-WINDING Model $31. (To airmail your order place 15¢ postage on envelope.) FREE Catalog on request via ordinary mail. For airmail enclose 50¢ stamps.

**OLLECH & WAJS, Dept. K-15**
**8039 ZURICH, SWITZERLAND**

## 2" Invention Shoots BBs thru 100 pages of this magazine!

Only 2" x 1", this new pocket size device has amazing power and accuracy. Ease in operating, utmost power and safety. Order now get **FREE** Extras. Handy Automatic BB Dispenser, spare Velocity Cone, generous supply of BBs and Target . . . all for only **$1.98** ppd., 3 for $5.00. Not sold to N.Y.C. residents or minors. Satisfaction Guaranteed!

**GRAYSON PROD, Dept. C-10**
**210 5th Avenue, New York, N.Y. 10010**

## INSTANT ELECTRICITY ANYWHERE...

Tiny Tiger

**ONLY $89.95 Post Pd. in U.S.A.**

**350 WATTS .85 HORSEPOWER**

**Amazing compact power unit delivers instant electricity anywhere! Weighs only 12 lbs. / 10¼" long x 7½" wide x 8½" high / fits in hand / 115 volts AC / 350 watts, 12 volts DC, 12 amps. Manufactured in U.S.A. / warranted and guaranteed by the manufacturer.**

• charge batteries / light 3-rm. house / pump bilges / operate power tools, radio, TV, appliances / ideal for camping, boating, hunting, fishing, ranches, farms, resorts, Civil Defense, aviation survival and emergency power anywhere. Features 2 cycle, .85 hp air-cooled engine, recoil starter, adjustable carburetor, flywheel magneto system. Uses pre-mixed (10 parts gas / 1 part oil) fuel . . . rated at 6,300 r.p.m.'s governed. Runs approx. an hour on only 14 oz. of fuel. Generator is direct drive with automatic overload relief.

**SEND CHECK or M.O. TO:**
**TINY TIGER GENERATORS**
**118 N. St. Clair St., Toledo, Ohio 43604**

## 14 FIELD GLASSES, TELESCOPES

FREE Catalogue! Thousands war surplus optical bargains. Lenses, Prisms, Telescopes, Binoculars, etc. Jaegers, 691G Merrick Road, Lynbrook, New York

SCIENCE Bargains! Lenses, Telescopes, binoculars, microscopes, kits, parts, war surplus. Send $1.00 for beginner's 10-lens kit with instruction booklet. Order Stock 2-CN. Request Free 148-page Catalog CN, Edmund Scientific Co., Barrington, New Jersey.

ASTRONOMICAL books, Star—Atlases, free list. Herbert Luft, Box 91, Flushing 64, N. Y.

BUILD Your Own Reflector Telescopes: Complete Kits; Mirrors, Eyepieces, Tripods, Free Catalog F describing other accessories sent on request. Also Free Brochure describing amazing line World Famous "Dynascope" Reflector Telescopes. Criterion Manufacturing, Dept. KP 31, Hartford, Connecticut.

BINOCULARS Direct from Manufacturer. Finest Quality, Tremendous Savings! $19.95-$29.95. Request Catalog. Koyu, 3860 Crenshaw Blvd., Los Angeles, Calif.

## 15 SPORTING GOODS, GUNS, FISHING TACKLE, ARCHERY, TRAPPING

FREE Wingshooter's Handbook. New helpful facts on shotgun shooting, shotgun chokes and how to save ammunition. Write to: Poly-Choke Co., Dept. 1021C, Hartford, Conn. 06101.

FREE . . . Wholesale Catalog. Beads. Spinners. Lure Parts. Sinker Molds. Jigs. Reels. Finnysports (PE) Toledo, Ohio 43614.

FREE! Newest edition famous Corcoran catalog. Largest selection hunting, camping, fishing equipment. All items field tested. Boots, clothing, fishing tackle, tents, gun cases, sleeping bags. Dozens of specialties. Corcoran, Dept. PS-105-C, Stoughton, Massachusetts.

WALKIE-TALKIES: 3TR W/9V Batteries. Range 1000 ft., Dependable. $14.95 pair, postpaid. Stauffer's, Box 1187, Salina, Kansas, OZ.

Urheberrechtlich geschütztes Material

PIKE Lures & jigs. 3—$1.00. S & G Lures. RD 1. Clay. New York.

UNDERWATER Fuse 3/32" diameter 30 feet with plans, formulas, instructions $1.00 postpaid. Buy $3.00 worth, get 10 feet free. Wayno, Box 182-B, Addison, Mich.

ALTER Jap rifles to 30-06 or 257—$6.00. General Gunsmithing Catalog 15c. T P Shop, West Branch 10, Mich.

SAVE Up To 50%, On Brand Name Fishing Tackle. Free 76 Page Catalog. Orchard Trading Co., Box 21-P, Middleville, Michigan.

## 16 CAMPING EQUIPMENT & TENTS

CAMPING Equipment, unusual selection. Morsan's own quality Tents (200 Styles) finer fabrics; Sleeping Bags (80 styles), every camping convenience imaginable. Free giant Catalogue-Guide-Handbook, Morsan, 819-G Route 17, Paramus, New Jersey.

## 17 DOGS, BIRDS, HAMSTERS, RABBITS & PETS

RAISE Rabbits on $500 month plan. Free details. White's Rabbitry, Mt. Vernon, Ohio.

LIVE Seahorses, marine specimens, aquarium supplies. Illustrated catalog 15c. Marine, Box 626-107, Dania, Florida.

GUARANTEED Hunting Hounds, reasonable. Catalog 10c. Clayco Kennels, Henrietta, Texas.

EARN $10.000 yearly raising Angora Rabbit Wool for us. Information 25c coin. American Angora Company, Malta 1, Montana.

## 18 EARTHWORMS, CRICKETS, FROGS

EARN Money raising fishworms for us! Exciting details free! Oakhaven-121, Cedar Hill, Texas.

WIZARD Worm Caller—Pops up worms like Magic. Operates on house current. $4.95 postpaid. Money back guarantee. Sierra Electronics, Box 3275, North Hollywood, California.

MEN! WOMEN! Make money raising Bait. We buy your crop! Wigglers, Warsaw 3, Indiana 46580.

FREE Literature—We teach you how to raise, sell fishworms, crickets. Hybrid redworms 3000—$5.95. 5000—$8.95. 10.000—$16.95. Postpaid. Carter Farm-12, Plains, Georgia.

## 19 FARMS, OTHER REAL ESTATE

ABANDONED Timber Leaselands! Choice 640 acre Sportsmen's paradises still available—$20.00 plus $6.50 Taxes yearly. Maps, pictures, $1.00 (Refundable). Director, Erindale 3, Ontario, Canada.

CANADIAN Vacation Lands: Full price $385.00. 40 acres, $10 month. Suitable cottage sites, hunting, fishing, investment. Free information. Land Corporation, 3768-D Bathurst, Downsview, Ontario, Canada.

FLORIDA Campsites—deep in the heart of the great Ocala National Forest. Good hunting and fishing. Free maps and Photos. Winfree Vernor, DeLand, Florida. AD646369D.

$1 Acre — Canadian Border — Hundreds campsites, islands, farmlands, directly from Tax Authorities. (Non-profit). Lists, photographs mailed. Register, Room 204, 92 King St. E., Toronto 1, Canada.

400,000,000 ACRES government public land in 25 states. Some low as $1.00 acre. 1965 report. Send $1.00 National Land, 422PS10 Washington Building, Washington, D.C.

FLORIDA Water Wonderland—Home, Cottage, Mobilesites. Established area. $590 full price. $9.00 a month. Swimming, fishing, boating. Write: Lake Weir, Box HA 38, Silver Springs, Florida. AD 6-1070 (F-1).

FREE!—Fall-Winter Catalog. Big, 180 pages! Selected Best thruout the U. S. Thousands of properties described, pictured—Land, farms, homes, businesses, —Recreation, Retirement. 490 offices. 35 states coast to coast. World's Largest. Mailed Free! Strout Realty, 50-ZB E. 42nd St., NY, NY, 10017. 7 ZB S. Dearborn St., Chi., Ill., 60603. 521-ZB E. Green St., Pasadena, Calif. 91101.

**PEDOMETER**
Measures the miles as you walk. Ideal for sportsmen, scouts, etc. $2.00 P.P.
**CHARLES ANDREWS CO.**
2466C HOLTON, ST. PAUL, MINN.

**MONEY IN WORMS**

SUCCESS for You! Raise Fishworms and Crickets. Write for FREE literature and our Success Story in LIFE Magazine. Let us teach you our Secrets of Success.
**Carter Worm Farm-15, Plains, Georgia**

**MAKE $ SELL TIGER KITS**

$49.95

Bike Motors & Motorized Skateboards. Plans, Photos & Brochure—$1.00. Brochure only—25c.
**TIGER INDUSTRIES, BOX 413-PS1**
**Laguna Beach, Calif.**

THE Only "No-Risk Land Purchase Plan" in America—10 year money back guarantee on any Vacation, Retirement, or Investment homesite in Boiling Spring Lakes—the multi-million, 14.000-acre development on the Carolina Coast. All facilities, electricity, roads, shopping center, motel, golf course, country club, already in. Private ocean beach. ¼-acre homesites as low as $435.00; $5.00 down. Write for free literature. Boiling Spring Lakes, Southport 2-K, North Carolina 28461.

"CAL-ORE Ranches" in Oregon's Rogue River Valley near Medford and Grants Pass. $2995 to $5995. Pay $150 down, $35 monthly. Free catalog. Cal-Ore Ranches, 1054PS South Riverside, Medford, Oregon.

FREE! 152-page Fall-Winter catalog! Over 1700 Pictures! Farms, Ranches, Homes, Businesses, Vacation and Retirement Properties in 28 states coast to coast! United Farm Agency, 612-PS West 47th St., Kansas City, Mo. 64112.

## 20 TREES, SHRUBS, ROOTS, HERBS

GINSENG bringing $14 pound. Have seeds, plants. Goldenseal. Full information. G. Collins, Viola, Iowa 52350.

## 22 PROFITABLE OCCUPATIONS

POLAROID Camera Owners! Earn Immediate Cash. Instructions 25c. Carstens, 406-PS South Second Street, Alhambra, California, 91802.

INVESTIGATE Accidents. Earn $750 to $1.400 monthly. Car furnished. Expenses paid. No selling. No college education necessary. Pick own job location. Investigate full time. Or earn $8.44 hour spare time. Men urgently needed now! Write for Free Book. Absolutely no obligation. Universal, CPS-10, 6801 Hillcrest, Dallas 5, Texas.

MAKE Money Writing Short Paragraphs. Information Free. Barrett, Dept. C-86-HB, 6216 N. Clark, Chicago 26.

AUCTIONEERING—Resident and Home Study Courses. Diploma granted. Auction School, Ft. Smith, Ark.

VENDING Machines—No Selling. Operate A Route of Coin Machines and Earn Amazing Profiits. 32-Page Catalog Free. Parkway Machine Corporation, 715PSP Ensor Street, Baltimore 2, Maryland.

BECOME independent with your own franchise business. Thousands earning handsome incomes. Request interesting facts today. National Franchise Reports, F-528, 333 North Michigan, Chicago 1.

INVESTIGATE Fires, Storm Damage, Accidents for Insurance Companies—pays up to $1.000 a month, part or full time. No college necessary. Car furnished; expenses paid. We train you at home in spare time. Keep present job until ready to switch. Pick your location. Men badly needed now. Full information Free. Write Liberty School, Dept. C-110, 1139 W. Park, Libertyville, Illinois.

SCIENTIFIC Massage: Big earnings, uncrowded profession. Learn spare time at home. Diploma awarded. Free catalog. Write: Anderson School, Dept. J2-C, Princeton, Illinois.

"COURT Reporters earn up to $20.000 a year. Learn how at home. For Free information write Stenomachine School, Dept. S, 1421 Agawala, Knoxville, Tenn."

OPERATE your own investigation business. Free details! T. Trader, 210 Fifth Ave., New York 10, N. Y.

SERVICE Small Appliances-Toasters, Irons, Shavers, Mixers, Tester and 128 Page Book. Complete $49.50. Information Free. Craft Laboratories, Box 606, Westfield, New Jersey.

FREE Book "990 Successful, Little-Known Businesses." Work home! Plymouth-85M, Brooklyn, New York 11218.

CIGARETTES—Makes 20 plain or filter-tip for 9c. Factory-Fresh pipe tobaccos. Mild tropical flavored Philippine cigars. Facts free. Moberly, Box 907, Owensboro, Kentucky.

FREE Literature—Make Big Money Raising Fishworms and Crickets. Carter Farm-10, Plains, Ga.

## 23 BOOKS & MAGAZINES

BOOKHUNTERS: All Subjects. Send Wants! Sydney Jaher, 175-45 88 Ave., Jamaica, N. Y. 11432.

SAVE To 84% On Books. Free Catalogue. Discount Reader's Service, S-5435 Upland Way, Philadelphia 19131.

HISTORICAL-Genealogical-Biographical monthly magazine 35c. CS Box 746, Burlington, Vermont.

FREE Catalog of books and prints on costume, gloves, boots, corsets and other subjects. Naboma Company, Box 20725, Los Angeles, California 90006.

CHALLENGING! Different! Unusual books. Free catalog. Ruby's, D-31, Paradise, Pennsylvania 17562.

ATHEIST, intellectual, scientific, research books. Free Catalog. Truth Seeker, Box 2832, San Diego, Calif. 92112.

OLD & new books supplied! Monson, 4524 Montview, Denver 7, Colorado.

FREE Catalog unusual books. Murry Company, Dept. 265, 3000 Truman, Kansas City, Mo. 64127.

PAPERBACK Parade—Details sent free. KVA, Box 387P, Thousand Oaks, California 91360.

## 24 JOKES, GAMES, NOVELTIES, ETC.

GAMES Inventors! We are interested in new and novel child and adult game ideas. Nationally-known game manufacturing and marketing firm. Send for details. Hagglund and Associates Research, Dept. B, 650 Ottawa Ave. N., Minneapolis 22, Minnesota.

FREE Catalog—Tricks, Jokes, Funny Cards—50 samples 25c. Dohn-9K-Marks, Broadview, Illinois.

NUCLEAR War Game. Scientific! Modern! $3.98 Complete. Nuclear War, Box 722, Downey, California 90241.

READ "What I Know About Women" in 20 pages. Send $1.00. 2902 Holiday Dr., Arlington, Texas.

## 25 MAGIC TRICKS, PUZZLES, ETC.

COMPLETELY illustrated 84 Page Catalogs, 25c. Manhattan Magic, Box 334-S, N.Y.C. 11.

WORLD'S finest professional magic Joker novelties, Giant illustrated catalog 10c. Top Hat, Evanston 13, Illinois.

164 PAGE Giant Deluxe Top Secret Catalog Handbook! 1,000 World's Greatest Tricks! Illustrated! Sensational! 10c complete! Vick Lawston's Magic! Dept. PS65, 4018 N.E. Fifth Ave., Ft. Lauderdale, Florida.

FUN 'n Magic Catalog 10c. (1,500,000 tricks, jokes, novelties, puzzles, disguises, books). Elbee, 7408-J, San Antonio, Texas. 78207.

NEW Edition, 1965 Catalog. 500 Tricks, only 10c. Fastest same-day service to magicians for 40 years. Send 10c today. Douglas Magicland, Dept. 22, Dallas, Texas.

FREE magic catalog. Houdini sensational escapes, handcuffs. Stage illusions, Magic, Jokes. Write today, Heaney Famous Magician, Oshkosh, Wisconsin 54902.

BE A MAGICIAN! Introductory catalog with free trick only 35c. Ireland Magic, 5080 Lincoln, Chicago, Illinois 60625.

MAGIC Catalog World's Finest. 3000 Tricks, 408 Pages, $2.50. Beginners, Amateurs, Professionals. Kanter's, A-200 S. 13th St., Philadelphia, Pa. 19107.

GIANT Magic Catalog and free trick only 10c. Write today. Mailmart, S1065 Box 616, White Plains, N. Y. 10602.

## 26 COINS & CURRENCY

CIVIL War Specials: 1863 Cent, $1.75; 1863 Civil War Token, $1.75; 1864 Genuine Confederate States of America $10.00 Bill, $2.00. All three $5.00. Rarcoa, 31-A North Clark, Chicago 60602.

NEW transistor instrument detects buried coins, gold, treasures, metals. Free information. Relco-C41, Box 10563, Houston 18, Texas.

100 FOREIGN coins $2.95. 2 Mexican silver dollars $1.00. 5 China silver dollars $2.95. 100 foreign bills $3.95. Elizabeth, Box 3332, Anaheim, California 92803.

INDIAN Cents, 12 different, $2.00. Free Price List. USCO, Box 638, Amityville, New York.

DENMARK coins—3 different—25c; Jolie, Box 50, Brooklyn, N.Y. 11224.

10 DIFFERENT Indian Cents, Bargain Lists, $2.25. Hobby Sales, St. Paul, Minnesota 55116.

TRUNKFUL 25,000 Indian-Lincoln cents mixed (from the 1920's and older). "Grab-bag" style. 400 mixed $25.00. Sample bag of 20—$2.00. Mrs. Fischer, Box 5490, Sherman Oaks 5, California.

COIN Date Guaranteed. Restores Dates On Worn Nickels $1.00 Per Bottle. Box 276-P, Morresville, N. C.

LINCOLN Penny, poor mans double die uncirculated $4.00. Fifty Indian Pennies $14.00. Brookline Coin, Dept. P, Box G, Auburn, Mass.

BEAUTIFUL Uncirculated $½: Oregon Trail $13.50, Pilgrim $11.00, Stone Mountain $7.75, Washington $3.00, Carver $2.50. 1964 Proof Set $15.00. Gigantic Bargain Catalogue $1.00. Bebee's Incorp., 4514 North 30th, Omaha, Nebr. 68111.

TOPS! Free Illustrated Booklet "How To Collect Coins." Plus large illustrated catalog. Approvals. Littleton Coin Co., Littleton E2, N. H.

GIGANTIC Coin Clearance. Illustrated lists 10c (refundable). Hutchinson's, Box 6256, Philadelphia, Pa. 19136

COIN Magazine, 200 pages. Sample 50c. Numismatic, 7320 Milwaukee, Chicago 31.

FREE Coin Supplies, Giant Coin list 10c (refundable). Economy Sales, Mansfield, Massachusetts.

TEN different Liberty Nickels $2.00. Coin lists free. Sayers, 1000 Unaka, Johnson City, Tennessee.

"YOUR Fortune in Coin Collecting." You too can make big money with coins. Reward yourself! $1.00 postpaid. M. R. Martocci, Box 1214, Hartford, Conn. 06101.

LINCOLN Cent set, 1941-1944. 63 Values complete (No -SD) circulated—$3.25 postpaid! Molzan, 3228 Fruitvale, Oakland, California 94602.

KEY CHAIN. Canadian Nickel embedded in Plastic from Nickel Capital of the World. Colors Red, Blue $1.50. Two for $2.75. Mi-thel Plastics, 1081 Attlee Avenue, Sudbury, Ontario, Canada.

SILVER Dollar $1.75; 3c Nickel $1.85; ½-Dime $2.75; 3c Silver $2.75; Flying Eagle Cent $3.50. Fairway, 121-R, Rye, New York.

ANCIENT Roman bronze coins, $3.00 each. Frank Henny, Box 472, Flemington, New Jersey.

# LINCOLN CENTS

## SCARCE DATES

1917D, 17S, 18D, 18S, 19D, 20D, 20S, 25D, 25S, 26D, 27D, 28D, 29D, 29S, 30D, 30S, 34D, 35D, 35S, 36D, 36S, 37D, 37S, 39S, 42S, 48S, 49S, 54P, 54S.

**FOR SALE at 15¢ each.**

**TIPSICO COIN CO.**

**6837 Kiami St., Tucson, Arizona 85715**

$1.00 SPECIALS!—4 different Indian cents—$1.00; 10 different Lincolns before 1921—$1.00; 12 different mint marked Lincoins before 1941—$1.00; 15 different "S" mint Lincoins—$1.00; 4 different Liberty nickels—$1.00; 8 different Buffalos—$1.00; 7 different "S" mint Jefferson's—$1.00. Norm Roberts Ent., Box 117, King of Prussia, Pa.

25 DIFFERENT coins from 25 foreign countries. $1.00 bargain. Hindley, Box 708, Aurora, Illinois.

10 INDIANHEADS $2.90; Ten V-nickels $2.95; Large Cent $1.75; Two-Cent copper $1.50. Nelson, 346-R, Rye, N.Y.

LINCOLN Sale: 90 different Lincolns, 1909-1964, $3.95 Postpaid! David Bixler, Onn, Iowa 52320.

FOR Sale! 30 Lincoln cents before 1941, all different, $2.00. Gene Carlton, Chandler, Okla. 74834.

80 PAGE illustrated United States and Canadian coin list 10c. Stone, 260 Washington, Boston 8, Mass.

GENUINE Confederate Notes, $1.50 each; 3 For $4.00. Hank Bieciuk, Box 1235, Kingore, Texas.

UNUSUAL to look for in U. S. Coins. Details-Stamp. "Dahle", Box 2007-PS, Omaha, Nebraska 68120.

TWENTY Page 1965 retail price list of USA and Canadian coins 10c. Our retail selling prices on thousands of coins and coin collectors supplies. Bryson Incorporated, 612B White, Toledo 5, Ohio.

LINCOLN Cents XF. 3 for $1.00. 1955S, 1954P, 1949S. Edel's, Carlyle, Illinois 62231.

1955s MINT Set $2.00. List Free. Coins, Box 48, Grandview, Tenn.

## 27 OLD STAMPS WANTED

I PAY $250 each for 1924 1c green Franklin stamps, rotary perforated eleven ($2,500 unused). Send 20c for illustrated folders showing amazing prices paid for old stamps, coins, collections. Vincent, 85PS1 Bronx, New York 10458.

## 28 STAMP COLLECTING

U.S. Mint Specials! Flag Set Complete, $1.00; 1c, 2c, 3c Famous Americans (21 different), $1.00. Free list. Brooks, 2601 Avenue "U," Brooklyn 29, N. Y.

702 U.S.A.—25c (plenty commemoratives). Request Approvals. Horace Gatewood, Winston-Salem, N. C.

NUDES set (4)—Unusual Approvals 10c. Atlas, Plainfield, Racine, Wisconsin

UNITED States commemorative collection containing 33 different—10c. Approvals. White, 516-W Avenue L, Brooklyn 30, New York.

FREE! Giant Bargain Catalog — New Edition listing thousands of bargains including U.S. and B.N.A. Stamps, packets, mixtures, albums, accessories and supplies; sent with beautiful approvals. Jamestown Stamps, Dept. E 105PS, Jamestown, N. Y.

EXCEPTIONAL 125 different, cataloging $3.00. Include triangles, commemoratives, 10c approvals. Reeves, Box 37597P, Miami 37, Florida. 33137.

WOW! 110 All Different Germany 10c Zeppelins, Semi-Postals, Airmails, High values, etc. Giant Catalog, bargain lists included with beautiful approvals. Jamestown Stamp, Dept. A105PS, Jamestown, N. Y.

225 STAMPS For only 10c! This mammoth value includes Airmails, Pictorials; stamps from strange Countries cataloguing up to 25c each! Also Approvals. Mystic Stamp Company, Camden 55, N. Y.

PENNY Foreign stamps, neatly mounted in jumbo books in Scott order. Bullot Philatelics, 1454 Coney Is. Ave., Brooklyn 30, N. Y.

AMAZING Offer! 200 U.S. stamps—including commemoratives, airmails, high denominations to $1.00—only 10c to Approval Applicants!! Illustrated Bargain Lists free. Mystic Stamp Co., Dept. 55, Camden, New York.

WORLDWIDE, 50 all dicerent, absolutely free—just to introduce our incomparable approvals. Kent Stamp Company, GPO Box 87, Brooklyn, N. Y.

500 DIFFERENT Stamps, $1.00 with approvals. Smith, 508U Brooks, College Station, Texas.

25 Different U.S. Commemoratives 1893 Up 10c. Approvals. K&B Stamp Co., Box 70, Bklyn 23, N. Y.

CHURCHILL Memorial Cover. Valuable Collectors' Item! Scarce Memorial Envelope bearing portrait and autograph of the great Warrior-Statesman. Postmarked with day-of-death cancellation at London, SW1—Post Office serving House of Parliament and official residence of British Prime Ministers. Also included to introduce you to the World's most rewarding hobby: (2) New collection of Churchill commemorative issues just released. (3) Illustrated Collectors' Catalog. (4) Stamps on Approval. (5) "How To Collect Stamps" book. Free Bonus—Complete set of 42 English Kings & Queens! Send 25c. Kenmore C-877, Milford, New Hamp.

WONDERFUL Lincoln Diamond, Giant Roosevelt, 100 Others Different, 10c. Approvals. B. & G. Stamp Service, 114 West Washington, Sigourney, Iowa.

200 EXTREMELY old and scarce U.S. stamps from 1873 to 1923 inclusive $1.00. No approvals. Morris, 5321 Fleming, Richmond, Californ....

TERRIFIC 1c & 2c approvals. Thousands available. Thoms' Stamps, P. O. Box 456, Richmond, Indiana 47374.

217 DIFFERENT, unused, Germany $2.00. Pitts, 1517 Williams, Winter Park, Fla.

"100 DIFFERENT U.S. 25c. Maine, 2408 Dayton Ave., Union, N.J."

ATTRACTIVE Triangle set free! Request approvals. Cutlass, Box 235, Chicago 60645.

FREE—Mint British Colonials from Antarctic Territory, Borneo, Brunei, St. Christopher, Nevis, Caymans, Trengganu, Pitcairns. Free with approvals. Viking, Great Neck 5, N.Y.

KENNEDY Memorial set. Mint. Colombian. Free! With Approvals. Stampex, Box 47-SP, White Plains, N.Y.

FREE!! Murdered Presidents!! Giant Lincoln, Set Kennedy, 25 others. Approvals. J. Mullican, 2820 Brunswick, Nashville, Tennessee 37207.

Will Rogers Air! Helicopter Triangle! Plus Monte Carlo Dove Triangle! Stamp printed in Solid Gold! New York Empire State Bldg. airmail, lovely Congo Orchids in full colors, etc. 10c with approvals. Sunny Stamps, Fruitport 10A, Mich.

FANTASTIC Hippo, Deer Triangles!! Valuable "Ben Franklin" on Canal Zone!! Flaming bi-colored Volcano Triangle!! Plus Icy Greenland, Weird Wild Beast issue and others. 10c with approvals. Roseland Stamps, Spring Lake 10A, Michigan.

FREE!! Congo Triangle Set! Boy Scout Beauty! 25 others. Different. Approvals. Cambridge, Box 411, Cambridge, Ohio.

FREE!! Five exotic triangles showing Birds, Flowers, etc. Approvals. Austin, Box 921, Severna Park, Maryland 21146.

DEALER'S Wholesale Catalog. Postage 5c. Franksco, 5031 Queensberry, Baltimore, Maryland 21215.

U.S. $$STAMPS Free! Columbus Issue, Pony Express, Antarctic Territory, Beetles, Togo, Kennedy, etc. Send 10c for mailing. Empire Stamp Corp., Dept. PR, Toronto, Canada.

5 DIFFERENT US First Day Covers $1.00. No approvals. Kelleher, Manchester, Mass.

25 DIFFERENT Turkey only 5c to approval buyers. Winehold, Airville, Penna.

FREE! 3 Mint sets—Discount foreign approvals. Sheff, 610 Waring Av., NYC 67.

FREE! 100 WORLDWIDE with penny approvals. 10c handling. Skytop, Box 1022-PS, Binghamton, N.Y. 13902.

25 GIANT Polish Stamps—Monsters—Dogs—Cats—Snakes—Olympics—Space—Rockets — Diamonds — Triangle — Horses (over 3 inches long)—5c with approvals. Moumblow, 19G Cedarhill, East Northport, New York 11731.



Urheberrechtlich geschütztes Material

UNITED Nations Set 10c with Worldwide Approvals. Lippert, 16958 East Warren Road, Detroit 24, Michigan.

215 DIFFERENT U.S. Commemoratives $1.00. Approvals. H. Holub, 18 East 198th St., Bronx, N. Y. 10468.

NINETEENTH Century Cancellations Free with fine U. S. Approvals. U. S. Stamp Co., Box 67, Tamiami, Florida 33144.

ATTRACTIVE set Free! Worldwide approvals. Gorlizz, Drawer 388CS, Park Ridge, Illinois.

FREE U. S. Catalog. Mint SC# 740-9 $2.00, 756-65 $2.10, 859-93 $6.00. Simmy Co., 40 Court, Boston, Massachusetts.

FREE Sample! Interesting, Informative. Illustrated. National Stamp News, Anderson, South Carolina.

100 OLD U.S. Stamps between 1861 and 1935 $1.00. Rousch Stamps, 51 Chestnut, Mansfield, Ohio.

FAR African Stamps—twenty-five different for fifteen cents with approvals. Florida Stamps, Washington Arcade, Orlando, Florida.

FIPEX — Tipex — Cipex — Ashville Four miniature sheets used for $1.00 if you ask for our bargain priced U. S. approvals. Triboro, 38 Park Row, N. Y., N. Y. 10038.

123 DIFFERENT colorful stamps, 10c. Bargain approvals. Krehl, 1708 Nebraska, Orlando, Fla.

FREE Surprise collection sent with approvals. Jay, 1784 Union, San Francisco, 94123.

GERMAN Commemoratives. 10c with approvals. Schaefer, Box 1704, Washington 13, D.C.

FREE! 29 thrilling jet, astronaut rocket, space, airmails. Send 10c handling. 2c approvals included. ABC World, Box 6000-WK, San Francisco, California.

TERRIFIC Value. Seven Complete Sets, 10c With Approvals. Beaties, Box 16052, Tampa, Florida.

MILLION Foreign Stamps! 2c each! Send for thrilling, giant approvals! ABC, Box 6000-ML, San Francisco 1, California.

LINCOLNS: 22 Different "S" including rare 1955S. $1.60. 28 different before 1940. $1.50. 16 different Brilliant Uncirculated in album, $1.60. All three $4.50. Harris, Box 1147G, Oceanside, California 92057.

FREE—Beautiful mint Indonesian pictorials plus bargain catalogue featuring U.S. stamps, packets, accessories. 10c handling. Approvals. Bydahl, Box 1293-SJ, Seattle, Washington 98111.

FINE Stamps! Generous bargain. Lot $1.00. Large high value packet $3.00. Literature, coupons free. Persile, 436 New York Avenue, Brooklyn, N.Y. 11225.

STOP. 2 cent approvals commemorates pictorials. R. Schnoebelen, Columbiana, Ohio.

EVERY stamp issued 1963 by Russia, 164 large Pictorials including Souvenir Sheet $4.00. Ten Years Russia, 1954 thru 1963, complete except 80 stamps, 1080 large Pictorials including 5 Souvenir Sheets $40.00. Free Price lists. Seymour Company, 2664 Grand Concourse, Bronx, New York 10458.

COLLECTORS-Investors. 50 Fabulous pictorials 50c. Alamo Stamps, 180 Faith, San Antonio, Texas.

$75.00 WEEKLY—Home, Spare Time! Approval Business. Exciting Details. $1.00 (Credited). Steele, Box 242-SM, Colorado Springs, Colorado 80901.

115 SPACE, Animals, Flowers, etc. 10c. Approvals. Stamp Farm, 3S3, Oxford, Wisconsin.

FREE! 1,000 hinges with bargain approvals! Stearns, 406-B South Second, Alhambra, California 91802.

SPECIAL Triple offer—111 All Different Stamps—25 All different Topicals—Full year's Membership in Las Vegas Stamp Society—All for $1.00. Our system puts your duplicate stamps to work for you, and gives you full catalog value for same. Kinnear, 558 AC Oakey Boulevard, Las Vegas, Nevada 89105.

SPECIAL—10 Mint Monaco Catalogs 60c Our Price 25c to Approval Applicants. Elkay Stamps, 210 Jewett Avenue, Jersey City, New Jersey 07304.

HUNDRED Different Worldwide Free! Approvals. Martin, Box 218, Tustin, California.


**INSIGNIA** ARMY · NAVY · MARINE **40 for $1.25**

Includes 40 Different Shoulder Emblems, Ratings, Chevrons, Q-Bars, Medals, Ribbons, Collar Insignia, etc. **ORDER NOW! Send $1.25 for 40 or $5.00 for 200. NO DUPLICATES—ALL DIFFERENT**

EMBLEM SALES CO. Dept. PS1
P.O. Box 167 Madison Sq. Sta., N.Y. 10

**'65 INDY "500" CLASSIC COLOR FILM**

The action, the excitement of the big '65 race for you in full color. See A. J. Foyt, Jim Clark and Parnelli Jones fight it out. 20 minute entertainment. 180' 8mm Eastman color.

*Order several now . . .* **$12.95** *ppd* Send check or money order

**SPORTLITE "500" FILMS**

P.O. Box 24-500, Speedway 24, Ind. Dept. PS


J. F. K., Churchill, Lincoln, Roosevelt Sets. 10c. Approvals. Postmark, Great Neck 9, N. Y.

FREE! Surprise "Mystery" packet. Premiums. Approvals. Dancer, B75-T58, Mansfield, Ohio.

10 NEPAL only 10c to those requesting our penny approvals. Griffis, Box 87, Garden City, Michigan.

SENSATIONAL Approval plus Gift Set. Broad Stamps, Box 866, Lexington, Kentucky.

80 DIFFERENT U. S. Stamps. Includes 1943 Flag Stamp of occupied Nations. Only 25c. Approvals included. Willett Co., Box 338-Y, Yorktown Heights, N. Y. 10598.

TEN different nineteenth century U.S. stamps for 10c. Approvals accompany. Mehling, 59 Brunswick, Williston Park, New York.

PRICE List Foreign Older Issues. Thomas, 5000 Miami, St. Louis 9, Missouri.

OLD scarce U.S. seconds on approval. Slightly defective, bargain prices. Hearnfeld, Box 318, Irvington, N. J. 07111.

MAYFLOWER Stamp Album 25c. 407 illustrations. 64 pages. Approvals accompanying. Niagara Stamps, St. Catharines 702, Ontario.

PENNY Approvals jammed with Bargains. For better values, try Putnam Stamp Company, Mahopac, New York.

FREE. 121 different Flag—Stamps—Approvals. W-B Stamps, Wilkes-Barre, Pa.

USA MINT 756 765 2.50. Cooper, Box 3751S, Oak Park, Mich. 48237.

40,000 DIFFERENT. Amazing new plan builds your collection systematically, country by country. As low as 50c weekly. Ware, Monroe 70, Conn.

ENORMOUS variety old U.S. flags, famous Americans, Commemoratives with approvals, surprise packet. 10c handling. Metropolitan Stamps, Box 312 PS, Jackson Heights 72, N. Y.

60 DIFFERENT U.S. (30 Commemoratives) 25c. No approvals. Seidenberg, Salem 169, Oregon.

50 DIFFERENT Old U.S. Revenue Stamps 50c. Winchester Stamps, Box 1592, Mansfield, Ohio 44907.

307 WORLDWIDE Different 25c. Sensational approvals. Niagara Stamps, St. Catharines 202, Ontario.

RUSSIAN space set 10c. Russian Approvals, topicals. Snedco, Waldwick, N. J.

U. S. UNITED Nations, Confederate States. Illustrated Price List Free. Stone, 260 Washington, Boston 8, Mass.

25 LARGE American Commemoratives 10c. Accompanying approvals. Free Perforation Gauge. Linstamps, St. Catharines 102, Ontario.

100 ROUMANIA Pictorials including Space, Sports, Animals. Only 25c with approvals. Baum, 1020 Grand Concourse, Bronx 51, N.Y.

U. S. BARGAIN: 50 different 10c with beautiful world-wide approvals. Stamps, Kennebunk, Maine.

1000 FINE Mixed United States Stamps 25c. Wright's, Box 2122, Hagerstown, Maryland 21741.

"50 U.S. STAMPS 10c. With Approvals. Busha, 527 W. 12th Ave., Oshkosh, Wisc."

CANADA Outdoor recreation complete 10c. Approvals. Rheaume, 6591 11th Ave., Montreal, Canada.

## 29 ANTIQUES, RELICS & INDIAN GOODS

TONS of Antique Gun Parts and Supplies. All Reproduction Muzzle Loading Guns. Send 50c for thick illustrated 11th Anniversary Catalog. Dixie Gun Works, Union City 13, Tenn.

WAR—Relics, Helmets, Medals, Swords—Catalogue 50c. Historical Americana, 226 East 89 St., New York 28, N.Y.

SELLING 20,000 Indian Relics, Arrowheads, Spearheads, Etc. List Free. Lear's, Glenwood, Arkansas.

10 GOOD Arrowheads $3.00, Hundred $18.00. List Free. Hyde's, Rosemar Rd., Parkersburg, W. Va.

Rare in collections. Ten, $1.00. Flint Arrowhead-making secret, ancient illustrated methods. Guaranteed. $1.00. Circulars 25c. Blackhawk, Umatilla 15, Oregon.

## 30 MINERALS & PRECIOUS STONES

JADE Tie Tack, Rockhound catalog $1.00. Dalley, Box 405A, Driggs, Idaho.

DIAMOND, Guaranteed Genuine Natural $2.00. Apprx. Weight ¼ Carat. C&J Diamond Tool Company, Box 97-S, Plainview, L.I., N.Y.

Get Free Catalog no serious rockhound, gem cutter, jewelry maker, hobbyist or Craftsman can be without. Full of bargains, exclusive items, low prices from largest suppliers and authorities in the field. Free . . new catalog just off the press—yours for the asking! Write Grieger's, Dept. C-14, 1633 E. Walnut, Pasadena, Calif.

SIX beautiful crystal groups from Mexico $2.00. 40 tumble polished gemstones $2.00 postpaid. Crystals from Africa, Brazil, Italy, etc. Send for free lists. Sering, 1705 E. Michigan, Indianapolis, Indiana.

EARTH Science Educational Magazine Subscription $2.50. Sample 35c. Box 550-PS, Downers Grave, Ill. 60515.

## 31 HOBBIES, COLLECTIONS

SOLDIERS, tanks, guns. Catalog 50c. Figurines, Box 62, Iberville, Que., Canada.

INTRODUCTORY Five Military Emblems and Illustrated Catalog, 25c; Foreign Medal, 50c; 10 Military decals 25c. Hobbies, Box 71-M, Rockaway 94, New York.

MILITARY Miniatures—Largest selection of the finest figures in U.S. Catalog #3 35c. Bussler Miniatures, Box 107-E, Wollaston, Mass. 02170.

LOVERS of the sea: Fascinating, rewarding, and inexpensive educational hobby (Sea Shells of the World). Send 35c for colorful booklet and price list now. Davy Jones Locker, 3 Ellen Drive, Farmington, Conn.

SEASHELLS amateur Collectors. Worldwide assortment. 37 Shells with 790 Color Illustrations—$2.00. Javo, Box 13288, Tampa, Florida 33611.

FINEST butterfly collections. List free. Marden House, Box 3213, Seattle 14, Wash.

## 31A MINIATURES

MINIATURE Model Lumber for Miniature Homes. Scale, one inch to the foot. Free Brochure. P. O. Box 385, Puyallup, Washington 98371.

## 32 PHOTO FINISHING, PHOTOCOPIES, ETC.

COLOR Movie Fans! 8 MM expertly processed for just $3.10 including fresh Kodachrome Film. All mailed back next day First Class. Craftsmanship guaranteed. Send exposed reel or request Free Mailers and Price List of complete services. Direct Mail Photo, Box 8352-PS, Pittsburgh, Pa. 15218.

FAST, Hi-Quality Finishing—Kodacolor Rolls: Eight Jumbo Prints $1.98—Twelve $2.49—Twenty $3.49—Reprints 15c. Also low B&W Prices. Custom Quality Studio, Box 4838-A, Chicago, 60680.

LIVING color portraits on silk, 100% oil, made from any snapshot or photo, professional artist, Japan, Exotic, Fascinating, Unusual. Free details. Portraits Import, 2411 Gage, Huntington Park, Calif.

PROTECT Your Photos, Snap-shots or Photographs, black and white or colored. Also Identification cards, Sealed in Heavy Plastic Laminate Forever, under heat-pressure. 3½"x6" or less, 50c. Solarek, 1037 Diversey, Chicago.

CUSTOM Enlargements: Black and White. 4x5—25c. 5x7—35c. 8x10—45c. Minimum Order: $2.00. Returned Postpaid. Dalu Photo, Box 4165, Baltimore, Maryland 21205.

## 33 MOTION PICTURES & COLOR SLIDES

8mm. MOVIES, 2"x2" Color Slides—biggest selection anywhere! World's Fair railroad, antique automobiles, circus, World War II, Hollywood classics, travel, wild life and many others. 16mm. new, used films also. Big Blackhawk catalog free. Blackhawk Films, 415 Eastin-Phelan Bldg., Davenport, Iowa 52805.

MOVIE Film! Free catalog! Eso-H, 47th Holly, Kansas City 12, Mo.

16 MM SOUND-Projectors, Films, New, Used for Sale. Free Catalog. National Cinema, 71 Dey Street, New York City, N. Y.

SAVE! Process your own movies at home. Free Catalog. Superior, 442-448 N. Wells, Chicago 10.

FREE Catalogues, 5,000 8-16MM Films. International-S Films, Greenvale, New York.

HART pays cash for used 8mm movies. 467 Parke, Birmingham, Michigan 48009.

LADY Wrestling, Movies, Photos. Free List. Peerless, Box 171-P, New York 13, N. Y.

16MM SOUND Features And Shorts. Bedner, 5300 So. Talman, Chicago.

## 35 MUSICAL INSTRUMENTS AND SONG WRITERS

SONG Ideas Wanted. Write with active, professional songwriters with publisher contacts. Records made. Share royalties. Send ideas—free examination. Songwriters' Associates, 236 W. 55 St., N. Y. 19-G.

POEMS wanted for new songs. Send poems. Crown Music, 49-P West 32, New York 1.

INCOME guaranteed two years for songpoems accepted! Free public releases! Castle's, 203-PS West 46th St., New York City 36.

SONGS, SongPoems: Wanted for Radio Show. Hollywood Music Productions, 6425-A-12 Hollywood Boulevard, Hollywood, California 90028.

GUITARS! Lowest prices, best deal in country. Famous brand catalogs free. Universal Guitars, 20 Clent, Great Neck, N.Y.

ACCORDIONS, Guitars, Band Instruments! Save to 50%. Famous makes. Easiest terms. Trades accepted. Free home trial. Free discount catalog. Mention instrument. International Music Mart, 5535-P Belmont, Chicago 60641.

EXCELSIOR Accordions and Amplifiers. World Famous. Save 50%. Buy Direct from Factory Distributor. Terms. Trades. Free Catalog. Excelsior, Box 3304-P, Chicago 60654.

**PLAY GUITAR IN 7 DAYS OR MONEY BACK**

In this Special Introductory Offer, you get Top Guitarist **ED SALE'S** 66 page system worth $3.00 which teaches you to play a beautiful song the first day and any song by ear or note in seven days! Contains 52 photos, 87 finger placing charts, 110 popular and western songs (words and music); a $1.00 Chord Finder of all the chords used in popular music; and a $3.00 Guitarist Book of Knowledge.

**TOTAL VALUE $7.00 —ALL FOR ONLY $2.98**

SEND NO MONEY! Pay postman $2.98 plus C.O.D. postage. Or send $3.00 with order and I pay postage. (Sorry, no C.O.D. outside Continental U.S.A.—please remit with order).
*Unconditional Money-Back Guarantee.*
**ED SALE, Studio 154-T, Avon by the Sea, N.J.**

**LEARN TO PLAY GUITAR** in just one week, or no cost. You get complete instructions, plus magic chord selector, 320 songs, **FREE AUTOMATIC GUITAR TUNER.** All for $3.98 ppd. Terry Elliot, Dept 1510, Box 1918 Grand Central Station, N.Y. 17, N.Y.

SONGS, Poems Wanted! Accepted songs published, recorded at our expense! Ted Rosen, 17-PS Longwood Road, Quincy, Mass.

24 ELEMENTARY Guitar Lessons, $7.95. Government approved teaching course on recordings. Also available for accordion and piano. Free literature. Vavro Institute, South Saint Paul, Minn.

GUITAR, Banjo Making, books, plans, wood, necks, tools. List 15c. Wildwood, 510 East 11th Street, New York 9, N. Y.

GUITARS $11.95. Electric Double Pick-ups with Tremelo Bar $49.95. Any make on hand. Amplifiers $27.50. Accordions $125.00. Concertina $350.00. Drums, 3-Piece Pearl Set $99.00. Wind Instruments $49.95 up. Write Information. Melody Music, 4951 W. 95th St., Oak Lawn, Ill.

DRUM SETS, Lowest Prices, No Money down, 10 day free trial. Send for our free catalog. Wonderland Drum Company, Box 621PS, Detroit, Michigan.

PLAYER Piano Books. Send for free catalog. Vestal Press, Vestal 8, N. Y. 13850.

CLARINETS, Trumpets, Guitars, Violins. All Band and Orchestra instruments. At Lowest Prices, 10 day free trial, No money down. Send for our free brochure (Specify Instrument). Wonderland Musical Instrument Company, Box 621PS, Detroit, Michigan.

BANJO Parts, Woods, Wire, Pearl. Box 5104, Long Beach, California 90805.

SPINET PIANO (new) $399.00, 15 year Warranty. No money down. Send for our free brochure. Wonderland Musical Instrument Company, Box 621PS, Detroit, Michigan.

GUITAR Making Books, materials, accessories, catalog 10c. Brown-David, Dept. 203, Box 15444, Tulsa, Oklahoma.

FREE Recording, your songpoem. For information, send poems: Musicrest, 12044 Chandler Blvd., North Hollywood, Calif.

"TIPS on Writing Saleable Songs"—$1.00—Barrett Publications, Box 182, Roy, Utah.

MUSIC service for Professional and non-Professional songwriters—Songs and Records Associates, Box 863, Burbank, California.

ELECTRIC Guitars, amplifiers, wholesale. Free catalog. Carvin, PSM, Covina, California.

POEMS wanted for songs. Royalties. Tin Pan Alley, 1650 Broadway, New York, N.Y. 10019.

SONGPOEMS Wanted. Send Poems For Offer. Nashville Music Institute, Box 532-PS, Nashville, Tennessee.

TAPE THIS AD TO THE BACK OF YOUR TV SET

**ALL TV-RADIO RECEIVING TUBES $1 ea**

All brand new, all at a flat discount price of only....

America's Greatest Source for Saving on High Tube Costs. Getting all Sets in Working Order.

- **All Tubes 1st QUALITY MADE IN U.S.A.**
- **All Sold on Written 24-MONTH WARRANTY**
- **All Orders SHIPPED 1st CLASS SAME DAY REC'D.!**

• If you know for sure which tubes are defective, order them @ $1 each, plus 25¢ postage and handling on your entire order.
• If uncertain which tubes need replacing, send for our FREE leaflet "How To Save On TV-Radio Repair Costs." This valuable leaflet should be taped to back of your TV set, and kept handy . . . 'cause tubes are sure to go! Write today to, Dept. PS-105.

**UNIVERSAL TUBE CO.**
Ozone Park, N. Y. 11417

LYRICIST/Composer Partner wanted. Give resume. "Dahle", Box 2007-PS, Omaha, Nebraska 68120.

PROFESSIONAL Service supplying demos, pressings, promotions, music printing. "Dahle", Box 2007-PS, Omaha, Nebraska 68120.

SONGWRITERS, Poets, Composers share $33 million dollars! Free Details, free songs. Nordyke Songs, 6000-23 Sunset, Hollywood, Calif. 90028.

## 35A PHONOGRAPH RECORDS

DISCOUNTS on all LP's. Free details. Citadel Record Club, 545 Fifth Ave., Dept. 3, New York 17, New York.

NEW LP'S—Stereo $3.50, Monaural $2.75, 45's—80c. Varmint Distributing, Silvis, Illinois.

INDEPENDENT Entertainers, Composers, Authors. Membership $1.00, record privileges. Avenue Records, Kentwood, Louisiana.

SINGLES, EP's, Albums. Stamp for list. "Record Sales". Box 2007-PS, Omaha, Nebraska 68120.

## 36 RADIO, TELEVISION, ELECTRONICS, HI-FI

TAPE recorders, Hi-Fi components, Sleep Learning Equipment, tapes. Unusual values. Free Catalog. Dressner, 1523 Jericho Tpke., New Hyde Park 1, New York.

SLEEP-LEARNING Kits—endless tapes, timers, complete outfits. Catalog free. SLRA, Box 24-SB, Olympia, Washington.

STEREO Tape. Save up to 60% (no membership fees). We discount recorders, batteries, accessories. We mail prerecorded tape, prepaid, anywhere that United States rates prevail. Free 60 page catalog. Saxitone, 1776 Columbia Road, Washington, D. C. 20009.

33c TUBES, Radio & TV! Free List. Cornell, 4217-S University, San Diego 5, California.

FREE 148-page electronics catalog. Big 43rd Anniversary edition! Thousands of astounding buys on stereo hi-fi components, shortwave, citizens band, tape recorders, radios, parts, kits, everything you need at "wholesale low" prices. Write: Radio Shack, Box PS-10, 2727 W. 7th, Ft. Worth, Texas.

BARGAIN Electronics catalog, 25c refundable. Electrolabs, Department D 629A, Hewlett, New York 11557.

KIT-Of-The-Month Club. Unique low cost electronic kits. Free information. Leader Enterprises, Box 44718-KE, Los Angeles, Calif. 90044.



Urheberrechtlich geschütztes Material

FREE—Free—Free—Free—Free—Free—Free. Send in for your Free one year subscription to Olson Electronics' fantastic value packed catalog—unheard of low, low prices on brand name speakers, changers, tubes, tools, stereo amplifiers, tuners, CB and other values. Credit plan available. If you have a friend interested in electronics send his name and address for a Free subscription also. Olson Electronics, Inc., 413 S. Forge St., Akron, Ohio 44308.

McGEE Radio Company. Big 1966 catalog sent free. America's best values. Hifi-Amplifiers — Speakers — Electronic parts. Send name, address and zip code number to McGee Radio Company, 1901 McGee St., Dept. PSM, Kansas City, Missouri 64108.

CRYSTAL Radio Kit $3.50. Learn electronics. All materials including tuner, dial, coil, diode, baseboard, earphone, etc. Complete directions. Mac's Tri-Kits, 212 Day Ave., Bakersfield, Calif. 93308.

INSTALL Your Own TV or FM Antenna—Save up to $50. Exclusive Free booklet reveals secrets of antenna orientation, installation; tells how to get official TV/FM reception analysis for your area. Plus prices, specs, of famous Chanel Master Antenna Kits. Write: Dept. "S", Jefferson-King, South Fallsburg, New York 12779.

NEW Mfrs. Surplus Record Changers B.S.R. stereo cartridge & 45 adapter $15 each. Changers, Inc., Box 144, Jerome Ave. Sta., Bx. 10468, N. Y.

TAPES: Recorders: Accessories: Finest quality, lowest prices. Send for free list and premium offers. Tape Mart, Dept T, 39-17 47th Avenue, Long Island City, N.Y. 11104.

ASTOUNDING Government surplus illustrated catalog 20c. Meshna, Nahant, Mass.

## 37 BUSINESS OPPORTUNITIES

PACKAGE at Home For Profit! We Supply everything. No "selling." Free Home Business details. HPC, 807-HSD Sunset, Los Angeles 12.

BUILD Custom Cases at Home For Profit. Get orders by Mail. We Supply materials, instructions, everything. Free Home Business details. Customcase, 805-CSD Sunset, Los Angeles 12.

$100.00 WEEKLY spare room. Raise redworms odorless, soilless way. Charlie Morgan, Box 116-C Bushnell, Florida.

EARN Money raising fishworms for us! Write: Oakhaven-42, Cedar Hill, Texas.

COLORGLAZED Concrete pottery made without molds. Patented method. Cemetery products, novelties, tiles. Basement leak-sealing. Money-making projects. Booklet, details free. Men only. National Potteries, Grand Rapids, "Minnesota."

BOOMING Mail Order Wig Business. Market unlimited, profits unlimited. Agents needed in all states. Head O' Hair Studios, P. O. Box T, Costa Mesa, Calif.

VENDING Machines—No Selling. Operate A Route of Coin Machines And Earn Amazing Profits. 32-page Catalog Free. Parkway Machine Corporation, 715 PSB Ensor Street, Baltimore 2, Maryland.

SECRETS! Secrets! Mail order success revealed by internationally famous expert who discovered how to make home business fortunes. Beginners: Get free copy "How to Make Money in Mail Order." Discloses free advertising, profitable products, everything! No obligation. Write Mailco, 1554 Sepulveda, Dept. P69A, Los Angeles 25.

LEARN landscaping and the growing of plants. Start a profitable business part or full time. Free information without obligation. Lifetime Career Schools, Dept. PSC-105, 11826 San Vicente Blvd., Los Angeles, Calif. 90049.

400,000 BARGAINS Below Wholesale! Many Free. Liquidations, Job Lots. Single Samples. Free Details. Bargainhunters Opportunities, Box 730-B, Holland, Michigan.

HOW And Where to Raise Capital. Details Free. Financial, Box 785-A, Springfield, Missouri 65801.

## WANT A MAIL ORDER BUSINESS

Without investing a fortune? HOME BUSINESS DIGEST is your selling Bible. Jam-packed with useful information on where to get astounding bargains with big sales appeal, how to sell for many times your investment. Only $2.00 a year, plus a long list of extra benefits including 4 issues of MAIL ORDER WORLD OF OPPORTUNITIES, worth $1.00 a copy. Carry no stock. Send $2.00 today to

**HOME BUSINESS DIGEST** Dept. PS-10
2907 West 39th Place, Chicago, Ill. 60632
or Home Business Digest,
G.P.O. Box 972, New York, N.Y. 10001

WANT To Make Big Money At Home? $10.00 profit in an hour possible with Invisible Mending. Make tears, holes disappear from clothing, fabrics. Steady year-round demand from cleaners, laundries, homes. Details Free. Fabricon, 1535 Howard, Chicago 26, Illinois.

IMPORT-Export opportunity, profitable world-wide, mail-order business from home, without capital; or travel abroad. We ship proven plan, for no risk examination. Experience unnecessary. Free details. Mellnger, Dept. P69A, Los Angeles 25.

MAILORDER Catalogs. No Inventory required. Discounts 40% up, postpaid. Send 25c for 32-page sample catalog featuring 150 unusual, fast-moving products and complete details. Satisfaction guaranteed. Gaylords, North Adams 8, Mass.

FREE "Franchise Profit Letter" tells how unique NFR service is helping thousands seeking profitable businesses. Write today. National Franchise Reports, PS-528, 333 North Michigan, Chicago 1.

PIANO Tuning learned quickly at home. Tremendous field! Musical knowledge unnecessary. Information free. Empire School of Piano Tuning, Box 327, Shenandoah Station, Miami, Florida. 33145. (Founded 1935.)

MAILORDER. No Investment in Products. Free Brochure. Methods. 1913-FD, Lafayette Hill, Pennsylvania.

SELL Advertising book matches. Write us today; we put you in business by return mail; handling complete line ad book matches in demand by every business right in your town! No investment; everything furnished free! Top commissions daily! Superior Match, Dept. PX-1065, 7530 S. Greenwood, Chicago, Ill. 60619.

INSTALL burglar alarms without previous experience or costly equipment. Big Profit. Free details. Nasco, 11071 Massachusetts, Dept. P699, Los Angeles 90025.

MAILORDER Book publisher wants dealers. Wholesale price-list free. Neil H. Tasker, Shamokin, Pennsylvania.

START own business! Booklet shows you how! Only 10c. Popular Mechanics Classified, Dept. S-5, 575 Lexington, New York, 10022.

EARN Big Money repairing electrical appliances! Learn in spare time at home. Free Book. Christy Trades School, 3214 W. Lawrence, Dept. A-5701, Chicago 60625.

NEW miracle liquid silver plates as it cleans. Polishes copper, brass, silver, nickel, fishing gear, musical instruments, jewelry. High profit fast seller. Details free. Arimo Company, 37 Yavapai, Wickenburg, Arizona 85358.

NET $12,000 Year. Home mailorder business. Tested, proven plan. Free information. Wainwright, 2714-C Chelsea, Charlotte, North Carolina.

YOUR own home business. Interesting, Profitable, Different. Details free. T. Richey, 441 East Main, Greenville, Ohio 45331.

OPERATE Proven, Profitable, Mailorder Program #3. Professional Methods. Free Details! Mail Sales, 520 Fifth Avenue, New York, N. Y. 10036.

FREE Booklet! Profitable spare-time business Bronzing, PearlKoting baby shoes! Complete set-up on credit. Kiktavi, Box 34861-G, Los Angeles, California 90034.

IMPORT-Export Business Made Easy. Complete setup service. Not just instructions. Hermes, 152 West 42, New York City 10036.

MANUFACTURE Decorator Brick Like Wall Tiles. 40c per 100. 500% profit. Instructions. Sample mold $1.50. Lemonde, 3216 Danskin, Wall, N.J

FOREIGN Forum Magazine—True international trade publication for Mail-order dealers, Drop-Shippers, Importers, Wholesalers. Copy 25c. Forum, Postbox 4361, Chicago 60680.

MAKE excellent profits selling new Delta ignition system. See our ad under "Auto Supplies & Equipment". Write today for details.

GET Into Custom Upholstery. Turn Old Furniture into big $$$ spare time. Reupholster chairs, divans like new. Make custom slip covers, drapes. No experience required. We supply everything. Write for Big Free Illustrated Book on Easy Home Instruction and how we start you in big $$$ home business. Modern Upholstery Institute, Box 899-OK, Orange, Calif.

BOOKKEEPERS operate Bookkeeping Tax Service. Universal, Box 664, Springfield, Missouri.

OPERATE Collection Agency "Little Gold Mine!" Franklin Credit, Roanoke, Virginia.

WORLD'S Largest wholesale supply. Buy from 7853 American, European, Japanese wholesalers. Tailormade suits from Hong Kong. 123 dropship catalogs. Rock-bottom prices. Free details. International Buyers, 216 PS2 Jackson, Chicago 6, Illinois.

CEMENTCRAFT — plastercraft for pleasure and profit Sample, catalogue 10c. Wooley Company, Box 29-D, Peoria, Illinois.

PLASTERCRAFT molds, liquid rubber, plasters, flocks, candle supplies. Catalog and manual free. Jayhawk Plasters, Blue Rapids, Kansas.

PRINTERS and salesmen wanted, for new proposition. Ornsteen, DuQuoin, Illinois 62832.

OPERATE Profitable Home Mailorder Business. Duquette, 76-PS Payson, Fitchburg, Mass.

NEW! Amazing 49c carded sensation. $20. hourly, $100.00 day easy. Six 49c samples $1.00. Refunded first order. Peck's, Box 316-P, Coffeyville, Kansas, 67337.

"SIGNS, easily made and painted by you with our letter patterns, supplies, raised letters." Paulo Industries, Crystal Falls, Michigan 49920.

FREE Advertising available in Playboy, True, others. Also: How to get started in mailorder. Details free. Palmer Publications, Dept. D11, Box 805, High Springs, Florida.

MAKE 500% profit selling new mail order money-maker books. Sure, easy way! Guide, Box 362-PS1, Yorktown Heights, New York.

LEARN Bonsai: Duplicate exactly $500 Imported Oriental Tiny Trees in few hours! Free Living trees to grow valuable Miniatures too; and tiny forests in bowls. Profitable Home Business! Request big free fact pack. Minitree, Box 23023-WG, Los Angeles, 90023.

$5,000. For part of your free time. Your own business. Free selling outfit. Opportunity to profit 8 Ways including cash commissions, monthly bonus, bonds, free insurance. Age no barrier. Full time or part time. No. obligation. Write Ortho-Vent, 4510 Brand Road, Salem, Virginia.

PROFITABLE, pleasant: Sell Books by mail. Free details. Value House, 17 Wilton Terrace, Verona, New Jersey 07044.

CAPITAL—How and Where to Obtain. Details Free. Sullivan's Enterprises, Box 20236-A, Denver, Colorado 80220.

SELL Books By Mail. 400% Profit. Royal, Box 450-M, Cleveland 27, Ohio.

FREE Book "990 Successful, Little-Known Businesses." Fascinating! Work home! Plymouth-825M, Brooklyn, New York 11218.

I MADE $40,000.00 Year by Mailorder! Helped others make money! Start with $10.00—Free Proof. Torrey, Box 3566-F, Oklahoma City, Oklahoma 73106.

CONCRETE Facts: Cement artists make big money. Previous experience unnecessary. Home shop—simple equipment—copyrighted methods and formulas. Make color and marbleglaze beautiful cement pottery without moulds. Wishing wells, bird baths, waterfalls, rustic garden and patio items. Free illustrated brochure. Hollywood Cementcraft, 602 E. Athens Street, Altadena, California, 91001.



Urheberrecht chgeschütztes Material

$60.00 DAY, manufacturing Concrete Posts. Carlane, 1803 Fremont, Rapid City, South Dakota 57704.

SPARE Time Earnings. With your Tablesaw, Bandsaw or Jigsaw. Write: Workshop, B3800 Harney, Vancouver, Washington 98660.

OPERATE Home mailorder business. Vosacek Printing, 4444-PS Ute, San Diego 17, Calif.

$70 WEEKLY—Home spare time. Simplified mail bookkeeping. Immediate income—easy! Auditax, 34741D, Los Angeles 90034.

MAKE Money mailing our postcards! Work home, full, sparetime. Particulars 10c. Westlee, Western Springs 2, Illinois.

OPERATE mail order business without investment — details — Livingstone, Box 5332, No. Charleston, S. C. 29406.

REPAIR Hydraulic Jacks. Easy, Profitable. Write: Hydraulics, 3000 Mountain, El Paso, Texas.

$6.00 HOURLY possible serrating knives by hand. Details free. Jacobs Enterprise, 712A Willsie, Rapid City, So. Dak.

MAKE $46 From Square Foot Plywood; Jigsaw necessary. Free Details. Woodarts, Bridgewater, Mass.

MOTEL Management—Approved home study course. Free booklet 107. Motel-Hotel Careers, Encino, California 91317.

RETIRE now! Enjoy Freedom, Lifetime vacation. Write, Box 923, Brandon, Florida.

R. H. CALLAWAY Son, P. O. Box 1141, Ft. Smith, Ark. 72902. Extra Profit income in a business of your own. Details free.

HOW And Where to get Capital, Loans, Grants, Cash to Start New Businesses. Free Details. National Counselor, Harlingen 3, Texas.

MAILORDER Laws $2.00. Alvin Kahn, Attorney, 4504-C Pine, Philadelphia, Pa.

TOP Mailorder Business Propositions! Write: Yates, Box 356-B, Dayton, Tenn. 37321.

PERFUMES, Perfume Oils, Cosmetics. Private Label. Farrand Chemical, Tyrone, Pennsylvania 16686.

READING Tutors earn $5 to $10 hourly. Learn at home. No educational requirements. Free Information. Reading Arts Academy, Dept. PSC-105, 1100 West "Q," Wilmington, California.

FREE Literature — Make Big Money Raising Fishworms and Crickets, Carter Farm, Plains, Georgia.

## 38 MONEYMAKING OPPORTUNITIES

WITHOUT experience, earn up $100 a week, spare or full time, showing 250 fast-selling household necessities. Write Gibson, Dept. 469, P.O. Box 1142, Indianapolis, Ind.

EARN Big Commissions Full or Part Time. Show America's largest line low priced business printing and advertising specialties. Calendars in season. Big Free Sales Kit samples hundred items used daily by business people. Build profitable repeat business. Start right now. National Press, Dept. 21 North Chicago, Illinois.

TO $100.00 Weekly, Mailing Catalogs. Sample, instructions, 25c. Costar, GPO Box 972-PS, New York 1.

VENDING Machines—No Selling. Operate A Route of Coin Machines And Earn Amazing Profits. 32-Page Catalog Free. Parkway Machine Corporation, 715 PSM Ensor Street, Baltimore 2, Maryland.

SELL Titania Gems: More brilliant than diamonds. Catalog 10c. Diamonite, 2420-F 77th, Oakland 5, California.

HOT Money Making Line! Show line of business printing, advertising specialties, calendars. Watch orders pour in. All repeat items. Terrific commissions in full or spare time. No experience—No investment. Cash discounts to customers. Free bonus gifts to you. Free sales kits. Willens-David Lionel Press, Dept. W-17, Waukegan, Illinois.

AMAZING successes through franchises! Become exclusive franchise holder your territory. Information rushed. National Franchise Reports, SP-528, 333 North Michigan, Chicago 1.

LEARN Expert Cake Decorating, Candy Making. Free details on home instruction method. Candy & Cake, Box 54-ABB, Redondo Beach, Calif.

MEN — Women! Start Money-Making Plastic Laminating Business at home in spare time. Material that costs 11c brings back $2.58. No canvassing or selling but mail orders bring in $20 a day. Write for full particulars free. Rush name on postcard to Warner, Room CL-3-LW, 1512 Jarvis, Chicago 26, Ill.

EASY to start rubber stamp business at home in spare time. Make up to $9.80 an hour without experience. Facts free. Write to Roberts, 1512 Jarvis, Room CR-3-LW, Chicago 26.

MAKE Money Writing Short Paragraphs! No tedious study! I tell you what to write, where and how to sell, and supply list of editors buying from beginners. Many small checks add up quickly. Write to sell, right away. Send for free facts, Benson Barrett, Dept C-86-HA, 6216 No. Clark, Chicago 26.

CLIP items from daily newspapers. Get $1.00 to $5.00 each. Details free. Walter, Box 1023-S, Erie, Penna.

FREE facts and descriptive bulletin. Be an Air Conditioning, Refrigeration, and Heating serviceman. High pay, jobs open everywhere, operate your own service business, no school or correspondence necessary. Write Doolco Trouble Shooter, 2016 Canton, Dallas, Texas.

EARN Big Money Fast! Take easy orders for Dwarf, Semi-Dwarf, Standard fruit trees, roses, ornamentals. $1,000 profit in 60 days possible. World's oldest, largest nursery. Spectacular full-color selling outfit Free. No investment. Stark, Desk 30406, Louisiana, Missouri 63353.

FREE! World's Greatest Mail Order Medium! Bargains Galore! Business Opportunities, etc. Popular Mechanics Classified, Dept. W-1, 575 Lexington, New York 10022.

MILLIONAIRE Status Secrets! Guaranteed! Infallible! $7 Millions Successful! Majestic Mountain Manor, Box 595, Wahiawa, Hawaii 96792.

MAKE Good money—spare or full time—with almost no investment. Details free. Stamp appreciated. John Frank Co., 648-PS No. Damen, Chicago, Ill. 60622.

202 FIRMS Begging For Homeworkers: Instructions $1.00 postpaid. Carter Company, La-Plaza Acres, Searcy, Ark.

WE Purchase items you make at home for us. Send stamp for details. Wolfe Specialties, Box 171-A, Center Line, Mich.

MAKE $5,000 yearly, sparetime, raising mink, chinchilla, nutria, etc. Free Booklet! Proven plan. Write Furs, Dept. K, Bewdley, Ontario, Canada.

DETECTIVES — Excellent opportunities —Travel. Experience unnecessary. Detective Particulars free. Write Wagoner, P-125 West 86th, New York 10024.

WORK Home, part-time, mailing our catalogs! Free details! Cam Company, Dept. 22, Verona, N.J.

MINK raising information free. Lake Superior Mink Farm, Inc., Superior, EE5, Wisconsin 54882.

MAKE Up To $50.00 Daily Soliciting Delinquent Accounts. Terrific Commissions. General Finance Co., Dept. LG-88, Pickwick Bldg., Kansas City, Mo. 64106.

SITTING On A Gold Mine? You may have unrecognized moneymaking abilities. Free information. H. Locke, 3913 Castro Valley Blvd., Castro Valley, California.

"YOU can make money with pocket coins, everyday stamps. Free information. Savoy, 15234 Russell, Allen Park, Michigan 48101."

EXCLUSIVE 77 Page Guide. Build profitable mailorder business. Buchwalter Sales, 834—175th St., Dept. 95, Hammond, Indiana 46324.

COMPLETE Mail Order Business Set-Up. Details 10c. Specialties, 1515 N. Franklin, Colorado Springs, Colorado.

NEED New Income Now? "Telephone your way to Money." Full or spare time. No investment! Practical, simplified instruction manual, $2.00 Postpaid. BBB Approved. Satisfaction Guaranteed. Edwards, Room 5-S, VFW Bldg., Kansas Missouri.

PROFITS—Sparetime at Home. Complete Step by Step Mailorder program. Amberco, Box 144, Shickshinny, Pennsylvania.

"VACATION With Pay." Makes money and travel. 100 ways. Details. Trail, Box 415, Abilene 1, Texas 79604.

HOMEWORK Opportunities! 100 companies begging for sparetime homeworkers! Complete list, instructions, $1.00. Brugenheimer Publishers, Box 158-AG2, Lexington, Mass.

MAKE money running your own restaurant. Information free. Write Dept. PS-9, Restaurant Management Institute, 3854 N. Sawyer, Chicago, Ill. 60618.

LEARN The secrets of repairing junk batteries. "Fabulous Profits" at home. Details: Batteryman, P.O. Box 416, Palm Desert, California.

MEN—Women—"Everybody Likes fine candy." Make professionally home . . . (Our 51st Year.) Ragsdale Candies, East Orange, New Jersey 07019.

FABULOUS Profits Raising Fishworms. Guaranteed market. Free Picture folder, Excello, Kosciusko 14, Mississippi 39090.

GREAT new way to make $250-$500 a month in spare time. Mail special order-getting cards to select list of buyers. No other costs! Invest only $1.00 for kit that puts you in business. Haase, 18-K Broadway, Denville, New Jersey.

TRADE Secrets list free. Butler Distributing Co., 3915 Woodlea Ave., Baltimore, Md. 21206.

DOLLAR Ad Service. $200. Week Plan. Free Details. Ad Market, Harlingen 6, Texas.

BECOME State Notary. Free Guidance. Stationers Exchange, Box 61, Bergenfield, New Jersey.

FREE Literature — Make Big Money Raising Fishworms and Crickets. Carter Farm-11, Plains, Ga.

SHARP $$$$ opportunity! One low-cost machine sharpens-serrates knives, scissors, pinking shears. Earn $6-$9 hourly in spare time. Professional results without experience. Free details. Beaver Grinder, Box 121, Gardena, California.

## 38A BUY IT WHOLESALE

BARGAINS! Buy Wholesale! Save Money! Free Catalog! Norris, Dept. 116, 273 Merrick, Lynbrook, N. Y.

NEW 6-color Deluxe below wholesale catalog. Automobile catalog and others. Housewares, clothing, furs, furniture, appliances, refrigerators, washers, dryers, vacuum cleaners, polishers, cookware, dinnerware, strollers, cribs, radios, stereos, phonographs, recorders, musical instruments, organs, typewriters, books, binoculars, luggage, sporting goods, bowling, golf, game tables, motor scooters, motor golf carts, power mowers, chain saws, boats, motors, bicycles, clocks, watches, diamonds, jewelry. Huge discounts, hundreds name-brand items. For free list (factory prices) postcard: Selbyco-6, Decatur, Illinois.

BARGAINS! Buy Wholesale and Below! Name Brands. Appliances, Furniture, Sports Equipment, Televisions, Cameras, Watches, Jewelry, Thousands More. Huge Discounts to $1,000.00 on New Automobiles. All Makes. Free Details. Write Today: World-wide, Bargainhunters, Box 730-B, Holland, Michigan.

BUY Appliances, Cameras, Watches, etc. at factory prices plus 10%! Free details! Cam Company, 436-09, Bloomfield Ave., Verona, N. J. 07044.

WORLD'S Largest wholesale supply. Buy from 7853 American, European, Japanese wholesalers. Tailormade suits from Hong Kong. 123 dropship catalogs. Rock-bottom prices. Free details. International Buyers, 216-PS Jackson, Chicago 6, Illinois.

"LOOK" New 1/12 Horsepower Electric Motors. 115 Volt Single Phase-1725 RPM. $9.95 Prepaid. 3 Horsepower Briggs Stratton Engines $34.50 Prepaid. Other sizes available. Walraven Surplus, Marion, Ohio.

ELECTRIC Guitars, amplifiers, wholesale. Free Catalog. Carvin, PSW, Covina, California.



Urheberrechtlich geschütztes Material

100,000 PRODUCTS Wholesale. Terrific Bargains! Wholesalers. 1265 Broadway, New York 1, N. Y.

## 39 FORMULAS, PLANS, ETC.

FORMULAS—All Kinds. Amazing Big Catalog 10c. Kemisco, Park Ridge 15, Illinois.

LATE Modern Manufacturing Formulas List Free. Chemical Service, Martville, New York.

NINETY Formulas with instructions $1.00. Limited time only. Mailway Chemicals, Box 381-PS, San Gabriel, Calif. 91778.

10,000 Money-making formulas, processes, 900 pages. $6.00. Wilson, Box 599-A, Markham, Ontario, Canada.

OUTSTANDING Book of formulas, processes, trade secrets. Free literature. Cassell, Box 1535, Eugene, Oregon 97401.

FOR Proof Of What You Can Do In Specialty Manufacturing Get Our Literature. It's Free! Miller—Chemist, 1517-A, Tampa, Florida.

## 40 PLASTICS

NEW Liquid casting plastic, clear, colors. Embed real flowers, butterflies, photos, coins. Send 25c for two handbooks "How to Cast Liquid Plastics" and "How to Make Extra Money at Home." Castolite, 65-102L, Woodstock, Illinois.

NEW! Pressure Sensitive Plastic Laminating Machines, Supplies. Details. Burr, 7645 Oakland, Kalamazoo, Michigan 49002.

PLEXIGLAS — Any thickness — Clear —Colors—Cut to size—Clear Rods—Tubing. McClarin Plastics, P.O. Box 168B, Hanover, Pennsylvania.

PLASTIC Embedders, Jewelry Workers. We have everything. Moulds, Findings. New Catalog 25c. David Co., 861 Broad St., Dept. P, Providence 3, R. I.

## 41 SCIENCE & CHEMISTRY

ROCKETS. New Illustrated Catalog 25c Single And Multistage Kits, Cones, Engines, Launchers, Trackers, Technical Information, Etc. Fast Service. Estes Industries, Penrose 6, Colorado.

FREE 3 Pyrex Test Tubes With Purchase $4.00. Catalog 25c. Chemicals, Apparatus, Biology. Mid-States Scientific, 7053 N. Clark, Chicago, Ill.

AMAZING New Book Of Science Experiments, formulas and Catalogue of Laboratory Supplies. Only 35c. National Scientific Co., Dept. PS-10, 13 S. Park Avenue, Lombard, Illinois.

UNUSUAL Science Projects. Catalog 10c. Bartlett Scientific, 2310 W. Stadium Blvd., Ann Arbor, Michigan.

COPYRIGHTED Theory Gravitation because pushing radiation from stars. $1.00 refundable. Carnahan, 4407 Avenue H, Austin, Texas.

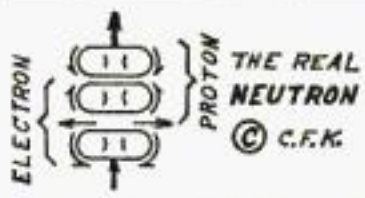
ROCKET engines, kits, supplies! Send for catalogue; Free when available. Krueger Rocket Company, 6428 South Main Street, Downers Grove, Ill. 60515.

UNUSUAL Chemistry books, courses, kits! Rare chemicals, cheap! Catalog 25c. National, Box 94, Redwood City, Calif. 94064.

ROCKETS: Powerful Multistage. New Illustrated Catalog 25c. Order direct from: Central Rocket Company, Waupaca, Wisconsin 54981.

QUALITY chemicals and laboratory supplies for industrial, school and home chemists. Catalog 35c. Sheard Science Supplies, Columbus, Wisconsin.

RUBY Laser Rods . . . Single crystal ruby rods are now available for the university student and amateur experimenter from one of the nation's leading fabricators of sophisticated optical elements. Rods are ¼" diameter, 3" long; finely polished, and with flat and parallel ends silver coated for immediate installation. $75.00 per unit plus $1.00 postage and handling. All rods guaranteed to lase. Money back if returned unharmed in 10 days. Valpey Corporation, Department 203, Holliston, Massachusetts.




**VORTEX** atom booklet on the real atom which has no nucleus and no orbital electrons.

Third edition, 25 cents.

**C. F. Krafft, 4809 Columbia Road**
**Annandale, Virginia 22003**

OPTICAL Art Moire Pattern Kit $1.00 Postpaid. Reducing Lens, Magnifier, Prism $1.00. Pantograph Tracing Device $1.00. Free Literature. H. Wolf, 116-12C 101 Avenue, Jamaica 19, N.Y.

300 PAGE Chemical, Apparatus Catalog. $2.00. Laboratory Materials, 1332 Hydepark, Chicago, Ill. 60615.

FREE. Science Catalog. Chemicals, glassware, physics, biology. Frey Scientific, 465 S. Diamond, Mansfield 2, Ohio.

SCIENCE Experiments Book, "How to Select, Perform and exhibit." Also includes 50 basic experiments. $1.00. Star Book Agency, 9512 Overwood, Dallas 38, Texas.

TECHNICAL Chemicals catalog 15c. MB Laboratories, Box 1922, Phila., Pa. 19105.

AMATEUR Rocketeers: "Rocket Propulsion Principles". The most accurate and comprehensive manual yet! Complete with propellant formulas, electronic firing, and actual rocket designs. Send $1.00. Aero-Fax Publications, P.O. Box 244, Lake Worth, Florida.

ROCKET fuse, propellants, formulas, chemicals. Catalog free. Mailmart, Soquel, Calif.

UNDERWATER Fuse 3/32" diameter 30 feet with plans, formulas, instructions $1.00 postpaid. Buy $3.00 worth, get 10 feet free. Wayno, Box 182-A, Addison, Mich.

FUSE, 15 ft.—$1.00! Also, 35 Rocket Formulas, etc. $1.00. S & C Labs, 21863, Colgate, Farmington, Michigan.

CONTACT Explosive: Explodes with touch of feather. Handled safely wet. Powerful. Ideal for jokes. Applies like paint. Made from household chemicals. Results guaranteed. Complete instructions $1.00. Franks Scientific Company, P. O. Box 1192, Corinth, Mississippi.

ROCKETS: Powerful Multistage. New Illustrated Catalog 25c. Order direct from: Central Rocket Company, Waupaca, Wisconsin 54981.

ILLUSTRATED Catalog: Chemistry, mineralogy, biology 25c. Tracey Laboratories, Evanston, Illinois.

ROCKETS—liquid and solid propellant. Giant catalog 25c (refundable first order). Plans and formulas $1.00. Hardan Manufacturing, Box 453, Chicago Heights, Ill.

LABORATORY conversion charts with discounts. Catalogue—25c. Hagenow Laboratories, Manitowoc, Wisconsin 54220.

AMATEUR Scientist's Magazine—Useful Information—Ideas. Sample—29c. $1.00 Yearly. Experimenter's Magazine, Manitowoc, Wisconsin 54220.

ROCKETRY!! Kits, single-multistage. 2,000 feet with powerful engines. Cones, Tubes, Parachutes, Launchers, Igniters. Big Catalog, rocket data, diagrams—25c Fast Delivery. Centuri Engineering, Dept. 43, Box 1988, Phoenix, Arizona 85001.

CHEMICALS and apparatus for industrial, analytical and private laboratories. Catalog 35c. Dept. M-26. Biological Supply Co., 1176 Mt. Hope Ave., Rochester 20, N. Y.

EXPERIMENTS, Chemicals, Apparatus, Biologicals. Illustrated catalog. Only 35c. Special—Chemical Resistant Gloves with Catalog. Dover Scientific, Box 6011, Astoria 6, New York.

## 42 EMPLOYMENT INFORMATION

DIRECTORY Reports. Construction, Aviation, Shipping, Oilfields, Government Manufacturing, Trucking, etc. Foreign—Stateside. Helpful information plus jobgetting tips on preparing application letters. Unconditional money-back guarantee. Only $3.00 ($3.25 Airmail). Research Services, Box 6768-PS, St. Louis, Missouri, 63144.

FOREIGN Employment. Construction, other work projects. Good paying overseas jobs with extras, travel expenses. Write only; Foreign Service Bureau, Dept. PS, Bradenton Beach, Florida.

TREMENDOUS Job Opportunities. Foreign-U.S.A., Construction, Trucking, Manufacturing, Government, Shipping. Thousands More. Up to $2,000.00 Monthly! Moneyback Guarantee. Directory Plus Sample Application Form Only $1.00 ($1.25 Air Mail). Worldwide Opportunities, Box 730-B, Holland, Michigan.

FOREIGN Employment: South America, Africa, Europe, Australia, USA. Earnings to $2,000.00 monthly. Construction, all trades, professions, occupations. Many companies pay fare, housing, benefits, bonuses. Write: Universal, Dept. A-3, Woodbridge, Connecticut 06525.

THOUSAND California Jobs now available! Employment agencies urgently need applicants, and encourage placement inquiry through mails. Current list top agencies Los Angeles, San Francisco, San Diego. Over 400 Listings (addresses, telephone numbers). $2.00. Infomart, Box 45345, Los Angeles, California 90045.

BOOMING Australia needs your skills! Government-assisted passage. Details $2.00. Irvin Heyer, 2913 Chestnut, Costa Mesa, California.

MOONPORT, Cape Kennedy Area. Be a part of the Aero Space team. General Construction—all trades. Electronic and Telephone Technicians. Engineers—all professions. Work in Florida's vacationland. U.S.A. and Foreign listings $2.00 ($2.25 Airmail). Ponderosa, 22 North Williams, Titusville, Florida.

## 43 AGENTS WANTED

YOUR Own business—Suits $1.50; Overcoats 65c; Mackinaws 35c; Shoes 12½c; Ladies' Coats 30c; Dresses 15c. Enormous profits. Catalog Free. Nathan Portnoy Associates, 2109-J Roosevelt Road, Chicago 8, Ill.

EVERY man a prospect. Refundable sales kit offer showing line belt buckles, tie clasps, money clips, cuff links, lapels, identification badges, individualized with customer's name and emblems. Cap badges for trucking, bus, taxi, police, firemen, also postal, letter carriers and heavy construction emblems. Choice 3000 emblems. Hook-Fast, Box 1088-PS, Providence, R. I.

WILL you test new items in your home? Surprisingly big pay. Latest convenience for home, car. Send no money. Just your name. Kristee, 163, Akron, Ohio.

CHRISTMAS Cards, Business and Personal. Customer's name imprinted. Earn unusually high commissions from this medium and high-priced line. Free Sample Album. Process Corp. (Our 44th Year.) 3442-B S. 54th Ave., Chicago, Ill. 60650.

BIG Commission: Selling Books, Several lines. Free details. Carter Company, La-Plaza Acres, Searcy, Ark.

FANTASTIC Hosiery Salesplan. Free outfit. Hosiery-P, 637 Federal St., Bend, Oregon 97701.

WANT To Make Up To $100 A Week spare time, and get free shoes for life, too? No investment. Rush card for free details. Mason Shoe Mfg., Dept. K-536, Chippewa Falls, Wisc.

AGENTS—300% profit selling genuine gold window letters; stores and offices. Free samples. Metallic Sign Letter Co., 1217-E West Newport, Chicago.

START Your Own Business On Credit. Your Own Boss. Hundreds of dealers making $100 to $300 and more weekly. We supply stocks, equipment on credit. 300 home necessities. Sales experience unnecessary. Pleasant, profitable business backed by world-wide industry. Write Rawleigh, Dept J-U-PSC, Freeport, Ill.

JAPAN'S Earrings! $1.00 refundable. Free Details. OHGA, PS-593, Sigakenkusatu, Japan.

ESTABLISH Your Own Business. Low Prices On Used Clothing, Shoes, Household Goods. Unlimited Profits. Free Catalog. Northwestern Distributors, 2129 North Western Avenue, Chicago, Illinois 60647.

INVESTIGATORS. Part-time, Nationwide. Send Resume. Fidelity Detective Agency, P. O. 51, Akron, Ohio 44309.

## 44 HIGH-GRADE SALESMEN

EARN Big Commissions Full or Part Time. Show America's largest line low priced business printing and advertising specialties. Calendars in season. Big Free Sales Kit samples hundred items used daily by business people. Build profitable repeat business. Start right now. National Press, Dept. 20, North Chicago, Illinois.

HOT Money Making Line! Show line of business printing, advertising specialties, calendars. Watch orders pour in. All repeat items. Terrific commissions in full or spare time. No experience—No investment. Cash discounts to customers. Free bonus gifts to you. Free sales kits. Willens-David Lionel Press, Dept. W-16, Waukegan, Illinois.

EARN extra money selling advertising book matches. Sample kit furnished. Matchcorp, Dept. PS-105, Chicago, Ill. 60632.

YOUR free copy of World's biggest sales magazine tells you how and where to make more money on your own in selling. Write Specialty Salesman Magazine, Desk 6B, 307 North Michigan, Chicago 1.

AMERICA'S biggest value wedding line! Big 40% profit showing wedding invitations and over 50 exciting accessory items. Ideal sideline for Christmas card, printing salesmen. Write for free display album. Elmcraft, Dept. EW 165, 7201 S. Cicero, Chicago, Illinois. 60629.

FREE to salesman, descriptions and pictures 200 new, fast sellers for spare time cash or side line profits. No charge. Just send name, age for sample copy. Opportunity Magazine, 850 N. Dearborn, Dept. 18G, Chicago, Ill. 60610.

$1,000.00 A month for making dramatic 3-second demonstration of amazing lightweight Presto Fire Extinguisher. New chemical used by Airforce snuffs out fires instantly. Only $4.95. Terrific commissions. Millions want it. Free Kit. Merlite, 114 E. 32nd, Dept. P66-P, New York 16.

SENSATIONAL new longer-burning Light Bulb. Amazing Free Replacement Guarantee—never again buy light bulbs. No competition Multi-million dollar market yours alone. Make small fortune even spare time. Incredibly quick sales. Free sales kit. Merlite (Bulb Div.), 114 E. 32nd, Dept. C-73-P, New York 16.

SELL Advertising book matches. Write us today; we put you in business by return mail, handling complete line ad book matches in demand by every business right in your town! No investment; everything furnished free! Top commissions daily! Superior Match, Dept. P-1065, 7530 S. Greenwood, Chicago, Ill. 60619.

ASTONISHING Automatic Toilet Bowl Cleaner, deodorizer. Works when toilet is flushed. Housewives buy on sight for every bathroom, at only $1.98 each. Make up to $10.00 in hour, spare time. Free Sales Kit. Merlite, 114 East 32nd, Dept. G-71P, New York 16.

GET New Shirt Outfit Free! $90 weekly on 5 average orders a day. Famous quality made-to-measure dress and sport shirts at $4.50 up, sell to all men. No experience needed. Full or part time. Write: Packard Shirt Co., Dept. 311, Terre Haute, Indiana 47808.

BIG profits selling automotive specialties to service stations, garages. Free wholesale price list. Inka Industries, 2405 Crocker, Houston, Texas 77006.

CALENDARS, Novelties—Full or Part Time. Liberal Commissions. Fleming, 6535-B, Cottage Grove, Chicago 37.

ROUTE work for man or woman with farm background. $25 or more profit per day to start—larger repeat orders. Write McNess, Freeport 43K, Ill.

ENGRAVED Plastic Name Badges, Desk, Wall and Door Signs. Trophies, Awards. Millions Needed. Big Profits. $1.50 includes your Badge with your name and Company name. Illustrated Catalogues. Discount Prices. Bedford Enterprises, Drawer 366, Station C, Orange, Calif. 92666.

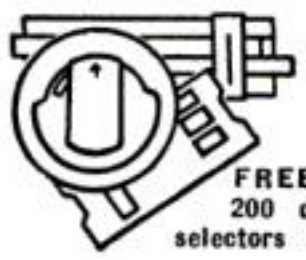
## 45 EDUCATIONAL & INSTRUCTION

BE A Real Estate Broker. Insure Security for yourself and your family. Study at home. Prepare for state examination. Write for Free Book today. Weaver School of Real Estate, 3519-R Broadway, Kansas City, Mo. 64111.

**LEARN WHILE YOU SLEEP!**

Fascinating, educational! Use your recorder, phonograph. Details, gigantic tape, record, equipment catalog FREE!

S.L.R.A. Box 24-B
Olympia
Washington



SPECIAL
SLIDE RULES

FREE catalog lists over 200 different slide rule, selectors & calculating aids.

DYNA-SLIDE CO. 600 S. Michigan Chicago, Ill. 60605

LEARN Communications Electronics. Get F.C.C. License. Correspondence, or resident classes. Free details. Write: Dept. 5, Grantham Schools, 1505 N. Western, Hollywood, Calif. 90027.

BOOKKEEPERS — Operate Your Own "Dollar-A-Week" System. Ellis, Box 203, Cedar Grove, North Carolina.

FCC LICENSE in 6 weeks, First Class Radio telephone. Results Guaranteed. Elkins Radio School, 2693A Inwood, Dallas, Texas.

WOODWORKING and Cabinetmaking course for beginning and advanced home craftsmen. Only complete low-cost home training program available. Write for free booklet. Interstate Training Service, Dept. G-2, Portland 12, Oregon.

PIANO Tuning quickly learned with home study course. Diploma granted. American Tuning School, Gilroy, California.

USED Correspondence Courses and Books sold and rented. Money back guarantee. Catalog free. (Courses Bought.) Lee Mountain, Pisgah, Alabama.

GRAPHOANALYSIS — Learn scientific handwriting analysis for profit, pleasure. Free sample lesson, catalog reveals plan. Write IGAS, Inc. 325 Jackson, Dept. 2 W 1, Chicago 6.

MISSOURI Auction School. Free catalog! 1330-05 Linwood, Kansas City, Mo. 4109.

"FINGERPRINTING By Correspondence." Civil Service Opportunities. Good Pay. Fingerprint School. 2759G-West Broadway, Los Angeles 41, Calif.

DEVELOP Mind Power, personality, memory while asleep! Free details. SLRA, Box 24-SF, Olympia, Washington.

EARN as you learn, camera repair. National Camera Rpair School offers accredited Home Study Course—instructions, texts, tools and practice equipment. Free information. Write Box 174PE9, Englewood, Colorado, today.

HIGH School Diploma at home. Qualified instructors. Approved materials. Southern States Academy, Professional Bldg., Dept. 12, Decatur, Ga.

MASTER Watchmaking at home. Free sample lesson. Chicago School, Dept. WW, Fox River Grove, Ill. 60021.

LEARN Civil and criminal investigation at home. Earn steady, good pay. State age. Institute Applied Science. 1920 Sunnyside, Dept. 337, Chicago 40, Illinois.

NEW self-teaching course in memory helps you achieve greater success in business and social world. Free book. Memory Studies, 835 Diversey Parkway, Dept. 1727, Chicago (60614).

LEARN Spanish rapidly (plain talk—not grammar). Free lesson. "Instant Spanish." Dept. K-2, 68 River Route, Kingman, Arizona.

LEARN to Service Oil Burners. Free information. Marlin Institute, Box 66095, Portland, Oregon 97266.

LEARN Auctioneering. Free Catalog. Reisch Auction College, Mason City 3, Iowa.

LEARN Air Freight. Unlimited opportunities! Fastest growing Transportation Industry. Licensed correspondence school. Free details. Air Freight Institute, 5267-PS, North Natoma, Chicago 60656.

COMPLETE your High School at home in spare time with 68-year-old school. Texts furnished. No classes. Diploma. Information booklet free. American School, Dept. X746, Drexel at 58th, Chicago 37, Illinois.

GAME Warden, Government Hunter, Forestry, Park and Wildlife Services announce job openings regularly. Prepare at home for outdoor work, good pay, security. Complete information Free! Write North American School of Conservation, 941-P North Highland, Los Angeles, California 90038.

NEW Home Radio Course only $26.95 complete. Tubes, components, tools, books included. Free literature. Edu-Kits, Department 628A, Hewlett, New York 11557.

EARN valid undergraduate or graduate college degree through correspondence. Free catalog. Registrar, Bretton Woods University, 3936 East 10th Street, Indianapolis, Indiana.

LEARN landscaping and the growing of plants. Start a profitable business part or full time. Free information without obligation. Lifetime Career Schools. Dept. PSC-105E, 11826 San Vicente Blvd., Los Angeles, Calif. 90049.

PIANO Tuning Pays. Big money in spare time. Learn at home. No musical knowledge necessary. Phonograph, records, tools and instructions furnished. Electronic tuning also taught. Free catalog. Capital Tuning School, 3160 S.W. 16th Court, Ft. Lauderdale, Fla.

FREE catalog. Self-help books. McConnell's, 37 Center, New Haven, Conn. 06510.

USED Courses, Books. Catalog 10c. Bayles, 78D Courtright, Wilkes Barre, Pa. 18702.

FREE "Sleep-Learning" literature/catalog. Over 38 "Self-Improvement" courses. Write: Ingram, 113-M West 42nd Street, New York City 10036.

B.Sc. DEGREE (Engineering) or College Entrance by home study. Send $1 for 1966 prospectus. CIST, Suite 813, 263 Adelaide St. W., Toronto, Canada.

LEARN to Drive Tractor Trailer, Trucks, Buses. Short Concentrated Courses Available. Write for Free Brochure. Driver Training Institute, 794 Bedford Avenue, Brooklyn, N. Y. JA2-5080.

USED Courses! Books! List 10c. Smith's, 124 Marlborough, Salem, Mass.

FREE General Catalog—100 Pages Text vocational, educational, instructional subjects. Millions of volumes, new and used. Bargain prices. Books bought. Est. 1902. Long's College Book Co., Dept. PS, Columbus 1, Ohio.

FREE literature "Six Steps to Voice Mastery." New 90 day home training course. Inexpensive. A dynamic voice can zoom your earning power. Career Aids, 635 Smith Road, Lisle, Illinois.

FREE Bible Course. Degree, College, 143 South Gregg Street, Charlotte 8, N.C.

COLLEGE Courses For Home Study on LP records by world-famous teachers, including eight Pulitzer Prize winners Credit at over 100 colleges. Institute for University Studies, Dept. 50, Bergenfield, New Jersey.

DRAFTING (Electronic, Mechanical, Architectural, Art). Home Courses $25.00. Send $2.00 first lesson. Prior, Inc. 23-09 169 Street, Whitestone 57, New York.

LEARN Income Tax; Payroll; or accounting inexpensively. No salesmen. Box 1225, Akron, Ohio.

SHORTCUTS to Graduation? Unique Report lists Resident, Extension opportunities. Auret, Allenhurst, New Jersey.

DATA Processing Correspondence Course. Prepare today for tomorrow's future. Certified teachers for individualized programmed instruction. College unnecessary. Send $1.00 for aptitude test and self-evaluation key to Mr. Michael, c/o DPCC, Box 533, Westport, Connecticut.



Urheberrechtlich geschütztes Material

## EASY-ON PLASTIC LETTERS

Pressure-sensitive vinyl plastic letters, numbers and symbols are easy to apply, adhere to any surface. They're weatherproof, washable, permanent . . . indoors and outdoors. Thousands of uses in the home and office. In five colors (red, white, blue, gold, black) and four sizes (5/16", 1/2", 1", 2", high). Moneyback guarantee.

Over **1,000** for **$1.00**

**Please specify size and color.**

Over 1,000 characters for $1 in 5/16" size; Over 500 for $1 in 1/2" size; Over 200 for $1 in 1" size; Over 100 for $1 in 2" size.
Add 15¢ per order for handling.

**WESTWOOD SALES CO.**
Dept. ZK-5, P.O. Box 295, Westwood, N.J.

"MENTAL Power through Sleep suggestion." Remarkable! Unusual! 110 Page book. $1.00. Satisfaction Guaranteed! Marvler, P. O. Box 907-T, Aurora, Illinois.

LOOKING For Higher Pay? Study business courses at home. Prepare for good paying position in business and industry. Men, Women, write for details, Aladdin Home Study Courses, Dept. A, 407 St. Louis, Springfield, Mo. 65806.

PENMANSHIP Corrector: Improve poor penmanship quickly. Details free. Ozment. Box 665 35, St. Louis 88, Mo.

ENGINEERING Home Study Simplified. Details. Erkatech. 7027 Smith, North Bergen. New Jersey 07047.

WRITE Fiction, articles, TV scripts, plays, with revolutionary Analytic Method of Writing. Free booklet. "Anyone Can Write!" . . . Write today! American Academy of Writing. Dept. 240. Box 988. Hammond. Indiana.

HOLLYWOOD Correspondence School of Bartending. Information Free. 5909 Melrose Ave., Suite 10B. Hollywood. California 90038.

ELECTRONIC courses. Industrial training programs now released to the public. Low tuition. Fundamental and advanced correspondence courses. Free information. Huntington Institute, Division of Lantec. Box 2244 C, Huntington Park, California.

## 46 CONTESTS

WIN Cold Cash! Prizewinner sizzles with terrific contests, torrid tips, impertinence! Free sample! Box 11569. St. Petersburg. Fla.

SWEEPSTAKES Contests. How To Win. Write for free information. General Contests. 1609-19 East 5th. Duluth. Minn. 55812.

## 47 DETECTIVES

DETECTIVE Training. Robert B. Phillips, Sr., Founder, Former Govt. Special Agent. For free information write to: 1917C North Kenneth Ave., Chicago, Ill.

DETECTIVE Profession. Home Study, Lapel Pin, Certificate. Future 2759CB West Broadway, Los Angeles 41, California.

DETECTIVE Course. Credentials, Diploma. Free Information. Southwestern Institute Criminology. Box 202, Geronimo, Oklahoma.

DETECTIVES — Excellent opportunities —Travel. Experience unnecessary. Detective Particulars free. Write Wagoner, P-125 West 86th. New York 10024.

## WANTED! WRITERS!

Short stories, articles, books, plays, poetry. Will help place, sell your work. Write today. Free particulars! **Literary Agent Mead**
**Dept. 125 915 Broadway**
**New York, N.Y. 10010**

**1000**
**Name & Address Labels $1 ppd.**
**Special Offer**
**Any 3 Different ORDERS $2**

Sensational bargain! Your name and address handsomely printed on 1000 finest quality gummed labels. Padded—packed with FREE useful Plastic GIFT BOX. Use them on stationery, checks, books, cards, etc. *1000 only* $1. SPECIAL—SAVE MONEY! ANY 3 DIFFERENT ORDERS $2. Makes an ideal gift.

**HANDY LABELS**
**1045 Jasperson Bldg., Culver City, Calif. 90230**

## 49 GIFTS

FREE Charm with Travel Bracelet order. Send for list of places—also spoons. Empire Imports. 2514 Genesee. Utica. New York 13502.

TERRIFIC Value. Precision Electric Shavers—Swiss made. Guaranteed Two Years. Reduced $9.95. Kaybern. 2024 Webster Ave., Bronx. New York 10457.

## 50 BUSINESS SERVICE, INFORMATION, NAME LISTS

LOCATING Service! Manufacturer, product, personnel. B. Barsketis. 2437 West 69 Street. Chicago 60629.

EXCLUSIVE reports monthly on Industrial Research activities. Details—Private Report, Box 11001, Memphis, Tennessee 38111.

LEARN Profitable Magazine Cartooning! Free Details. Cartoonists. Box 3097, Lincoln 10, Nebr.

## 51 SPECIAL SERVICES

FACTS, Any Subject-Products, Research, Surveys, Special Assignment, Reports. Information-25c. Horton, Box 1431, Greenville, South Carolina.

2" SCHOOL year dates and sleeve sport emblems. Raised wool chenille. Athletic colors. Specify your school colors. $1.00 per year set. $1.00 per sport emblem. No C. O. D.'s, please. Class Emblems, Box 3445, St. Paul, Minnesota.

INSIDE News from private Research Labs. Free details—Research Newsletter, Box 11001, Memphis, Tennessee 38111.

## 52 AUTHORS SERVICE

WANT Your Book Published? Learn how we publish, advertise, promote, distribute. Many successes. Free booklet PS. Vantage, 120 West 31, New York.

## 53 ADVERTISING, AGENCIES, ETC., FOR ADVERTISERS

FREE expert assistance for mailorder advertisers. Ratebook leading newspapers, magazines 10c. Chicago Advertising Agency, 28 E. Jackson, Chicago 4.

OUR clients' six mailorder advertisements in this magazine have to pay—and they do. If yours doesn't, contact John O. Powers Advertising Agency, 116 John. New York. 38.

LIST best Publications—Free. Mail order Advertising guide "Copy to Cash" $1.00. Gruman Advertising Agency, Box 884. Corpus Christi, Texas.

## 54 ART INSTRUCTION, CARTOONING, SIGN PAINTING

LEARN Sign Painting. Fascinating System. Straley, 410-P South Western, Springfield, Ohio.

18 CARTOON Lessons $2.00. 24 Advertising Lessons $5.00. Rm. 109, #6 Office Park, Birmingham 23, Ala.

LIKE to draw? Splendid opportunities in professional cartooning. Write for Free Catalogue. No obligation. National School of Cartooning. Box 8959-E. Cleveland 36. Ohio.

SIGN Painting-Instructions, Brushes, Equipment. Free Catalogue. Kaufman Supply. Centertown. Missouri.

LEARN Profitable Magazine Cartooning! Free Details. Cartoonists. Box 3097, Lincoln 10, Nebr.

## 56 RUBBER STAMPS & OFFICE SUPPLIES

POCKET 3 Lines $1.00. Office stamps $1.50. Free catalog. Specialty, 8464 Manhattan, Detroit, Michigan 48211.

THREE line pocket or office stamp $1.00. Win Atherton, Box 61, Randolph, Massachusetts.

FREE price list. 3 line pocket $1.00. Office stamps $1.50. Schaffer's Rubber Stamps, Auburn, Nebraska.

FREE 32 Page Rubber Stamp Catalog. Signature Stamps $3.50. Youngers Stamp Shop. Princeton, Iowa.

## 57 PRINTING MULTIGRAPHING, ETC.

PRINTING 500 8½ x 11 White Bond $3.50. Personal Stationery 100 sheets 5½ x 8½ 100 matching envelopes $2.75. Matt Koub. Clayton, California.

1000 THERMOGRAPHED Business Cards $3.25. Dealers Wanted! American, Box 166A. NYC 10459.

1,000 GUMMED Address Labels $1.00. Walt's, Box 966, South Bend, Indiana. 46624.

OFFSET Printing. Prompt service. Mimeo Press, 835 Fails, Rocky Mount, N. C. 27801.

BEAUTIFUL Business Cards, letterheads, envelopes, fliers, etc. Low prices. Free samples and pricelist. Pioneer, PS-10, Island Park, N.Y. 11558.

QUALITY Printing, lowest prices. Samples. Dowling Press, PSA5, Pittstown, New Jersey.

1000 BEAUTIFUL labels 50c. Rubber stamp 75c. Both $1.00. Discount House, Box 567, Malibu, Calif.

BUSINESS Cards. 1,000—$3.85; 2-color $4.95. Raised. Prompt. Guaranteed. Samples. Bixler, Benson Avenue, Frankfort, Kentucky 40601

QUALITY Printing. Send for free samples. Wyman's Printing, Box 214834, Sacramento, Calif. 95821.

LETTERHEADS 8½x11, $3.95. A-1 Printing, Box 4732, St. Louis, Missouri.

1000 ADDRESS labels $1.00, 1000 Business cards $3.95. Printing, Rubber Stamps. Jordan's 552 West O'Connor, Lima, Ohio.

ENLIGHTENING Dollar-Saving Quotations! Circulars, Booklets, Letters. Lonelm, Paulding, Ohio.

AMAZING Business Printing values. Samples. Print Shop, Box 576P, Greenville, R.I.

BUSINESS Printing. Letterheads, Business Cards, Envelopes, Calendars, Advertising Specialties, Book Matches, Rubber Stamps. Let me Quote. Marshall, Payne Road, 3, Bethel, Conn. 06801.

SELF-Sticking Labels printed. Advise needs. Literature. Eddy, 7 Greenacres, West Hartford, Conn.

## 58 PRINTING OUTFITS, SUPPLIES

PRINTING Presses, Type, Supplies. Lists 5c. Turnbaugh Service, Mechanicsburg, Pa.



Urheberrechtlich geschütztes Material

RUBBER Stamp Presses, Hydraulic Operated. Electrically heated. Sizes 5"x8", 8"x12", 10"x15", starting outfits, supplies. Printing Presses. Type Cases and Cabinets. Custom Manufacturing, 1464 East Commercial, Springfield 2, Missouri.

PRINTING Outfits, type, supplies. Send dime for illustrated supply book and samples. Kelsey, Inc., H-8, Meriden, Conn.

RUBBER Stamp Presses, Mounts, Supplies. Martins, 1425S Major, Jefferson City, Missouri 65101.

NEW Type Catalog. No. 11. 96 Pages. Send One Dollar, Deductible First Order. Acme Type, 732 Federal, Chicago, Illinois.

MAKE your own self-molding rubber stamps and printing cuts. Plexirubber, Argyle 2, Wisconsin.

LOW cost Rubber Stamp Manufacturer's Supplies. Jesson Press, Geneva, New York. 14456.

RUBBER Stamp Presses, Supplies. Kiewiet, 2025 Barney Road, Kalamazoo, Michigan.

## 60 FOR INVENTORS

***Advertisers using this classification in & after July. 1965 issue—please contact M. Z. Scott, Popular Science, before ordering ad.***

TREMENDOUS—Savings! Prepare your patent application yourself—easily, with our New "Patent Kit!" Complete instructions, materials, sample application—send $8.95 for immediate Delivery. Money-Back Guarantee! Congress Invention Company, 210A McKim Building, Washington 5, D. C.

U. S. PATENT Office Searches, 234 Broadway, Room 3615, New York. Free Invention Certificates.

PATENT Searches, professional patent development of inventions by Licensed Professional Patent Engineer and U.S. Patent Office Former Examiner with staff of engineering specialists in all fields of inventions. Expert searches performed in the U.S. Patent Office. Your inventions and ideas engineered for maximum patent protection and greatest commercial value. Inventions developed by us negotiated for cash or royalties with our nationwide contacts. Send for free Protection "Invention Certificates" and further interesting, valuable Patent Information. George Spector, Licensed Professional Patent Engineer, U.S. Patent Office Former Examiner, Woolworth Building, New York.

PATENT Searches, including copies of related U.S. Patents, $6.00. Inventors, attorneys, manufacturers use my "Worldwide" Airmail service! "Invention Record" form and "Information Every Inventor Needs," sent free! Miss Hayward, 1029F Vermont Av., Washington 5, D. C.

INVENTORS: Your ideas and inventions (patented; unpatented) expertly searched and developed for commercial appeal and cash/royalty sales to manufacturers by professional Invention Developer with excellent record of experience. B.S., Industrial Engineering; U.S. Patent Office former Patent Examiner; U.S. Government former Patent Adviser! Second decade of reliable service! Free "Invention Record" and Important Information. Airmailed! Write: Raymond Lee, Invention Developer, 1606V Bush Bldg., New York City 36.

PROFESSIONAL Patent Searches, $6.00, including official U.S. Patent Office copies of related U.S. Patents! Prompt, dependable service. Certified, Airmailed! For free "Invention Record Folio" and "Important Patent Information Every Inventor Should Have," write: United States Inventors Service Company, 1311 "G" Street NW, Washington 5, D. C.

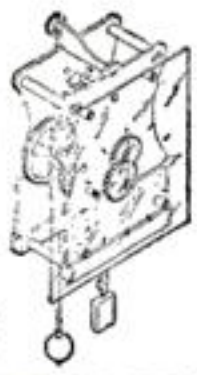
PATENT Searches including Maximum speed, full airmail report and closest patent copies, $6.00. Quality searches expertly administered. Complete secrecy guaranteed. Free Invention Protection forms and "Patent Information." Financial assistance available. Write Dept. 4, Washington Patent Office Search Bureau, 1426 G Street, N.W., Washington 4, D. C.

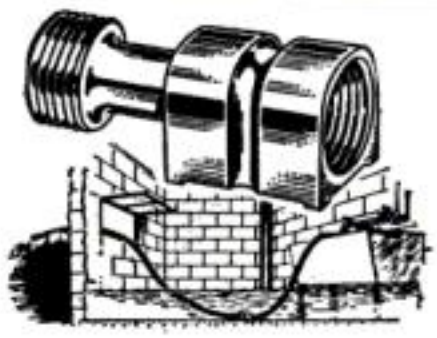
INVENTORS: Prepare your own patent application. Our "Patent Kit" includes detailed instructions and all necessary material. $14.75. Money back guarantee. National Inventors Company, Box 88, Ben Franklin, Washington, D.C.

**NEW!**
**ALL-WOODEN CLOCK PLANS**

Build this ideal hobby project from simple plans. No special tools required. Weight driven. Keeps perfect time. Will mount in grandfather case.

(Plans only) $3 R. D. Thomas, 1412 Drumcliffe, Winston-Salem, N.C.





**DRAIN FLOODED CELLAR FAST**

**Needs No Electric Motor or Gas Engine Power.**

When water gets into your cellar, or you want to drain out a pool, vat, cistern, excavation, boat, don't break your back hand-pumping or bailing. Just connect your garden hose to nearby water faucet and free end to intake side of SPEEDY DRAINER. Connect another length of hose to discharge side, turn on faucet, and normal water pressure makes the Drainer work. This precision-made, all brass, siphon pump has no moving parts to wear, jam or rust. It's priceless when you need it, yet costs only $2.98 postpaid. MONEY BACK GUARANTEE.

**LARCH, 118 E. 28, Dept. 215-A, New York 16**

**HEAVY DUTY BALL-BEARING PUMP**

**IRRIGATE • DRAIN**
**CIRCULATE • SPRAY**

Ball bearing, all-metal rust-proof pump. Stainless shaft. Use ¼ HP or larger. 1 HP for up to 5,200 GPH; 1,000 GPH 60' high or 3,000 GPH from 25' well. 1¼" inlet. 1" outlet. For direct or belt drives. **Only** ..... **$12.95**

**Famous Labawco Type P** utility pump. Hundreds of thousands in use. Stainless shaft. Won't rust or clog. Bronze bearing. Use ⅛ HP motor or larger. ¾ HP for up to 2,400 GPH. 1,800 GPH from 25' well. 1" inlet. ¾" outlet. Free coupling. A real value at **Only** ..... **$8.95**

Postpaid if cash with order.
Money Back Guarantee.
**LABAWCO PUMPS Belle Mead 101, N.J.**

SAVE High fees! Prepare your patent application yourself! New "Do-It-Yourself" Patent Kit now makes it easy. Free "Registration Form." Miss Blaine, 306 Carry Building, Washington 5, D. C.

INVENTORS: If you have an invention for sale, patented or unpatented, write for free brochure outlining manufacturers requirements, royalty rates. Kessler Corporation, C-710-FI, Fremont, Ohio.

IMMEDIATE cash, for Patent Applications, free Patent Searches. Write for details. Universal Patents, 184-B, Marion, Ohio.

FREE—"Vital Information Every Inventor Needs Before Selling Invention." Adams, 15 Park Row, New York City.

PATENT Searches. 48 hour airmail service, $6.00, including nearest patent copies. More than 200 registered patent attorneys have used my service. For free invention protection forms, write: Miss Ann Hastings, Patent Searcher, P. O. Box 176, Washington 4, D. C.

## 61 INVENTIONS WANTED

***Advertisers using this classification in & after July, 1965 issue—please contact M. Z. Scott, Popular Science, before ordering ad.***

INVENTIONS wanted. Patented; unpatented. Tremendous Manufacturers lists. Global Marketing Service, 2420F 77th, Oakland 5, Calif.

INVENTORS: Hundreds of manufacturers have requested our assistance in locating marketable new products. Complete information free. Institute of American Inventors, Dept. 30C, 635-F Street, N.W., Washington 4, D. C.

INVENTORS Wanted: Manufacturers need new items! Your inventions, ideas developed for cash/royalty sales. Free "Invention Record." Information, Raymond Lee, 1606W Bush Building, New York City 36.

INVENTIONS Promoted—For Cash-Royalty Sales with Manufacturer Contacts. George Spector, Licensed Invention Engineer, Woolworth Building, New York.

INVENTORS! Outright cash sale or royalties for your inventions. Patented. Unpatented. Active demand from our client manufacturers. Financial assistance available. Write Dept. 30, United States Invention Brokerage, 78 Wall Street, New York 5, N. Y.

INVENTORS! We will develop, sell your idea or invention, patented or unpatented. Our national manufacturer-clients are urgently seeking new items for highest outright cash sale or royalties. Financial assistance available. 10 years proven performance. For Free information write Dept. 54, Wall Street Invention Brokerage, 70 Wall Street, New York 5, N. Y.

INVENTORS! Don't sell your invention, patented or unpatented, until you receive our offer. Eagle Development Company, Dept. S, 79 Wall Street, New York 5, N. Y.

INVENTORS! Sell your invention for cash or royalties! Our client manufacturers eagerly seek new items. Patented. Unpatented. Financial assistance if needed. 25 Years proven performance. For free information, write Dept. 17, Gilbert Adams, Invention Broker, 80 Wall St., New York 5, N. Y.

INVENTORS: Protect your ideas! Free "Recommended Procedure". Washington Inventors Service, 422-G, Washington Building, District of Columbia, 5.

WE either sell your invention or pay cash bonus. Write for details. Universal Inventions, 298-G, Marion, Ohio.

INVENTIONS needed immediately for manufacturers. For additional information write Kessler Corporation, C-710-IW Fremont, Ohio.

MONEY Back Guarantee. Invention Marketing Plan. Wanetick Company, 770 Empire, Brooklyn, N.Y. 11213.

## 64 MODELS, MODEL SUPPLIES

ROCKETS: New Illustrated Catalog 25c. Single And Multistage Kits. Cones, Engines, Launchers, Trackers, Technical Information, Etc. Fast Service. Estes Industries, Penrose 3, Colorado.

SHIP and Yacht model fittings; Pine construction Hull Kits; blueprints. Send 50c for Illustrated catalog. A. J. Fisher, Inc., 1002 Etowah Avenue, Royal Oak, Michigan. 48067.

SHIP Models, Kits, fittings, plans, books, tools, engines, motors. Big illustrated catalog 50c. James Bliss & Co., Dept. PS, 342 Atlantic Avenue, Boston 10, Massachusetts.

AMAZING new plan. Build a miniature wood or plastic turning lathe. No castings necessary. Complete book of instructions and plans. $2.00. Rush cash, check or M.O. to Continental Plan & Design Corporation, Dept. 1050, P.O. Box 131, Rockford, Ill. 61101.

SPECIAL Tools for modelers, craftsmen. Catalog 10c. Brookstone, Worthington 3, Massachusetts.

STEAM Engines, Castings, finished. Boilers, Pressure Gauges, Injectors, Whistles, Lubricators, Pumps, Valves. Comprehensive 100 page Catalog. $1.00. Cole's Power Models, Ventura, Calif.

SHIP Model Kits and fittings: clippers, frigates, etc. Catalog, paint-tool list, book list, 35c. Model Shipways, Box 85, Bogota, New Jersey.

## 64B ELECTRIC TRAINS

LIONEL Trains Bulletin 10c, Catalog 25c. Mack Bros., 2041 Chicago Ave., Chicago 60622.



Urheberrechtlich geschütztes Material

## 65 HOME CRAFTSMAN

SKIL-CRAFTS New '65-'66 Catalog. Largest and Finest selection of Leathercraft, Artist, Hobbycraft supplies in the world. Free Gift with first order. Send 50c. Refundable with first order. Skil-Crafts, Box 167-PS, Joplin, Mo.

WOODWORKERS — Home Craftsmen! Catalog containing lamp parts, veneers, lazy susan bearings, Swiss movements, chair cane, folding metal legs, wooden legs, mouldings, furniture hardware, finishing materials, etc., only 15c. Barap Specialties, Box 2044-DC, Chicago 60609.

2512 PLANS, Patterns, Things to make do. Fun. Profit. World's greatest selection. New catalog 10c. Craftplans, 18250-B Harwood, Homewood, Illinois.

101 PATTERNS of smart Gifts, Novelties, Shelves, Action windmills plus "Make Money Jig Sawing." $1.00. Mastercraft, 105S, 7041 Olcott, Chicago 60631.

SQUAREKNOTTERS: Make belts, handbags, lanyards, dog leashes, etc. Special offer! Beginner's book, catalog and quality cord samples 25c. P. C. Herwig Co., Dept. 71-P1, 264 Clinton St., Brooklyn, New York 11201.

MAKE $100.00 Formica Counter Tops with few dollars' material. Complete instructions $1.00.—Build cabinets like professionals, with new manual, "Cabinetmaking Made Easy." $2.00. Japs, 126-L Seventh North, Hopkins, Minn. 55343.

## 66 DO IT YOURSELF

FREE Details. Marshall's Directory of "How-To-Do-It" Books. Marshall's, 1135C So. Birmingham, Tulsa, Oklahoma 74104.

BUILD Husky three or four wheel Garden Tractor, Powered Wheel Barrow, Composter using Plywood, our Components, Plans. Thomas N. Matthew Products, P.O. Box 573, No. Bergen, N.J.

AUTOMATIC Washer Repair Manuals on Norge, Hamilton, General Electric, Hotpoint, RCA Whirlpool, Kenmore, Westinghouse, Frigidaire, Kelvinator, $2.50 each ppd. Refrigeration Parts Catalog 50c. Sunbeam parts list 25c. Major Appliance, 13106 Caine Avenue, Cleveland, Ohio 44105.

PROTECT Your Valuables! Assemble, install simple, reliable "Protecto" Car Alarm from parts purchased at any automotive store. Easly followed illustrated instructions. 35c. Dept. A-4, 4304 North 37th Street, Omaha, Nebraska.

REPAIR your own Automatic Washer. Service Manuals for Whirlpool, G. E., Kelvinator, Frigidaire, Hotpoint, Hamilton, Westinghouse, Kenmore. $2.50 each. Royalwood Appliance Service, 1383 Royalwood Rd., Brecksville, Ohio. 44141.

## 67 OLD GOLD, JEWELRY, WATCHES, ETC.

USED and new watches $2 up. Free Catalogue, Southern Watches, 5-PS So. Wabash, Chicago 3.

CASH Immediately For Old Gold, Jewelry, Gold Teeth, Watches, Diamonds, Silverware, Spectacles, Platinum, Mercury. Free information. Rose Industries, 29-Y East Madison, Chicago 2.

HIGHEST Cash for Gold, Jewelry, Gold Teeth, Rings, Diamonds, Watches, Silver, Platinum. Mail Articles Today, Free gift with Information. Chicago Gold & Precious Metals, 6 E. Monroe, Dept. 2457, Chicago 3.

## 68 TOBACCO & PIPES

INCREDIBLY Cool smoking pipe. Unique air-cooled stem makes the difference, removes hot moisture and tars. You agree or money returned. Write for free brochure. Monarch Pipes, Dept A, Box 1431, Tulsa, Oklahoma 74101.

## 69 FOR THE HOME

CONVERT chimney gasses to usable heat. Free literature. Box 83, Simpson, Penna.

SURE Fire Sales—Every Home Needs personalized, aluminum nameplates for mailbox, lawn, post. Write: Starmetal Company, Box 340R, Neptune, N.J. 07753.

## MINIATURE, ALL PURPOSE CALCULATOR

**A precision instrument that will do all the calculations of larger expensive desk models. Weighs only 8 ounces, fits hand.**

Fast, accurate, sturdy . . . completely portable. Ideal for all on-the-spot calculating. Fully guaranteed. Price $120.00, available on trial basis. Write for *free* literature.

CURTA COMPANY DEPT. PS-10
P.O. BOX 3414, VAN NUYS, CALIF.

PELLET FIRING
**LUGER AUTOMATIC**

- MAGAZINE LOADING CLIP
- OVER 15 MOVING PARTS
- FULLY AUTOMATIC

**ONLY $1.98**

Automatic full size model of a Luger Automatic pistol—contains over 15 moving parts. Loads 8 complete rounds which snap into the hard butt simulating a Luger. Fires 8 bullet shaped pellets. Has automatic slide action. **Made of heavy, high-impact styrene with amazing attention to detail. Most Authentic Model Gun We've Ever Seen**

Comes to you with working parts disassembled with cleverly engineered springs, full instructions, supply of pellets and targets. **Full Money Back Guarantee.** Simply send $1.98 plus 27c shipping charge

**HONOR HOUSE CORP.**
**Dept. 97LG10 Lynbrook, N. Y.**
*N.Y. State residents please add 4¢ sales tax.*

**MAKE Any Car ROAR Like a LION!**

**The LOUDEST Auto Horn Made...**

deft control lets it roar, or bellow like an angry bull, or whisper gently. **$15.95 6 for $13 ea.** Write for our Auto Catalog.

**COUNTRY CLUB AUTOMOTIVE**
**614 Manufacturers Exchange**
**Kansas City, Mo. 64105**

## 70 OF INTEREST TO WOMEN

"PROPHET Elijah Coming Before Christ" Wonderful Book Free. 58 Megiddo Mission, Rochester 19, New York.

SUCCESSFUL mail order for women! H. Ohara, Pearl City, Hawaii.

MAKE Money Writing Short Paragraphs. Information free, Barrett, Dept. C-86-K, 6216 North Clark, Chicago, Illinois.

TRIPLE timer! Only $3.98! Free Catalog. Bell, Box 422-A, Asbury Park, N.J. 07713.

## 71 FOR SALE MISCELLANEOUS

T-PUZZLE. Send fifty cents to Alton Enterprises, Box 206, B.C., Canada.

BUILDERS! Make rafter cutting easy! Free information. Emmert Products, Sycamore, Illinois 60178.

FREE Bargain Catalog for mail-order buyers. Box 61, Kenmore, N. Y.

## 72 WANTED TO BUY

QUICKSILVER, platinum, silver, gold. Ores analyzed. Mercury Terminal, Norwood, Massachusetts.

## 74 RAZOR BLADES, SHAVERS

WHISKER Softener-Minute. Dime-Grocery. Year's Supply. Quadruples shaves per blade. Information $1.00 and self-addressed stamped envelope. L. Decker, 55 West Ontario, Chicago 10, Illinois.

## 75 TATTOOING SUPPLIES

LEARN Profitable, fascinating Tatooing. Illustrated Information $100. Zeis, 2220-B Delcy Drive, Rockford, Illinois.

## 77 TREASURE FINDERS & GEIGER COUNTERS

TRANSISTOR Treasure Detectors, underwater detectors. Many models. Free catalog. Gardiner Electronics Co., Dept. 1, 4729 N. 7th Avenue, Phoenix, Arizona.

TREASURE. Find gold, silver, relics with super powerful Detectron locators. Free information. Detectron, Dept. 9-PS, San Gabriel, California.

TREASURE, Gold, Silver, Relics. Find them with new 1965 models. Free information. Rayscope, Box 715, North Hollywood, California.

POWERFUL Metrotech Locators Detect Gold, Silver, Coins, Relics. Moneyback Guarantee, Terms, Free Information. Underground Explorations, Dept. D, Box 793, Menlo Park, California.

TREASURE Hunters, prospectors, beachcombers; pinpoint exact location buried coins, relics, gold, silver with powerful metal locators. Free literature. Write: Goldak, Dept. A-10, 1544 W. Glenoaks, Glendale, California 91201.

METAL-LOCATOR. No toy. $2.98 complete. Box 264, Flagstaff, Arizona.

EXCITING adventure locating hidden loot, treasure, relics, etc., with powerful, electronic M-Scope locator. Lightweight. Guaranteed. Very easy terms. Send for Free booklet, interesting customer reports. Fisher Research, Dept. DY, Palo Alto, Calif.

SAVE! Build Transistorized Treasure Finder. Details Free. Del Research, Box 347, Alden Manor, Elmont, N. Y.

NEW Coin Locator! Free literature! Howe, 811-A Kansas, Atchison, Kansas.

TREASURE-Fone Automatic. A new principle in electronic metal detection. Patent Pending. $129.50. Write: Highlander Co., Dept. 22, 10308 Brenda Way, Rancho Cordova, Calif.

NEW supersensitive transistor models detect buried gold, silver, coins. Kits, assembled models. $19.95 up. Underwater models available. Free catalog. Relco-A41, Box 10563, Houston 18, Texas.

METAL Locator kits and assembled models from $39.90. Terms. Transistorized models available. Free catalog Electronic Applications, Dept. S, Box 6095, Alexandria, Virginia.

COIN-COMBER metal detector. Sensitive silicon transistor circuit. $39.95 assembled. Racom, Box 13469-A, Orlando, Fla.

## 78 WATCH REPAIRING

WATCHMAKERS' Tools, Materials, Supplies. Watches. Catalog. Gales, Box 1000. Chicago 90, Illinois.

WATCH, clockmakers tools. Catalog 10c. Brookstone, Worthington 4, Massachusetts.

WATCHMAKERS'-Jewelers' supplies, instructions. Catalog 50c. Bengal's, 10717 Venice, Los Angeles 34, California.

WATCH and clock repairing books. Free Catalog. North American. Box 77-BL, Fox River Grove, Illinois. 60021.

## 79 MISCELLANEOUS

SAFEGUARD Privacy! New instrument detects electronic "bugs," wire-tapping and snooping devices. Free information. Dee Equipment, Box 7263-E3, Houston 8, Texas.

WINEMAKERS: Free illustrated catalog of yeasts, equipment. Semplex, Box 7208, Minneapolis, Minn. 55412.

FREE Wholesale Catalog! 10,000 Products . . . Tremendous Discounts! Taylor Distributors, Newton 3, New Jersey.



Urheberrechtlich geschütztes Material

This One
AQOQ-QGJ-DP1E

Urheberrechtlich geschütztes Material

FIVE Piece Scissor Set $3.95. 7" household; 6" ladies; 4" pocket; 3½" nail; 3½" embroidery. Howard, Box 32, Alden, Michigan.

"MEN—Impress your friends with a genuine leopard skin wallet from India. $9.95. Money back if not fully pleased. Hobbs and Leedham, 72 Hicks St., Brooklyn 1, N.Y.C."

ANYTHING you need, we locate for a reasonable fee. NBARS, 9325A Menard, Oaklawn, Ill. 60453.

WINEMAKERS: Professional results. Free catalogue. P. Markris, Box 3636, Milwaukee, Wis. 53217

ADD Good Health, Happiness, Success to your life. 3 booklets: Spirit Lifters, How to Live Longer, Health Diet. $1.00. Sunray, 11211 Kennebec, Detroit 48205.

AMAZING offer of handwoven Harris tweed, exclusive patterns, only $2.10 per yard. Also Scotch tweeds, suitings, plaids. 56 inches wide, price $3.00. Swatches free. Tailoring Service. Satisfaction guaranteed. MacGillivrays Tweeds, Muir of Aird, Benbecula, Scotland.

MEN! Confidential Directory contains 70 dealers, unusual unique items—$1.00. Cherry's, 300-NW 36th Street, Miami, Florida 33137.

FREE—Samples-Magazines-Gift offers—From Dealers everywhere. Hundreds. Listing 30c. Rorick's PS, Pleasant Plains, Ohio 45162.

SUPERSENSITIVE Listening-In-Device picks up any telephone conversation in vicinity. No connection to telephone necessary. Easily concealed. $2.98 Complete. Consolidated Acoustics, 1302J Washington, Hoboken, New Jersey.

NOW! Free brochure! 75 new gift ideas! Mendez, 426 S. Hill, Los Angeles 13, California.

BLITZ-Reducing! 5 pounds overnight! Guaranteed! Bijou, Box 1727-BV, Hollywood, California. 90028.

LISTEN-IN Device! Unnoticed! Monitor Telephone Conversations, etc. $3.98 complete. (Guaranteed.) Research Enterprises, 29-TL5 Samoset Road, Woburn, Mass.

PASSENGER-Carrying Miniature Trains; Brochure $1.00. Trains, 33-P Winthrop, Rehoboth, Mass.

## 80 PERSONAL

LOANS by Airmail $100-$1000. Anywhere. Confidential. Write Union Finance, Dept. PS, 222 W. Osborn, Box 7457, Phoenix, Arizona.

INVESTIGATORS, free brochure, latest subminiature electronic surveillance equipment. Ace Electronics, 11500-F, NW 7th Ave., Miami, Florida 33168.

BORROW $1,233 Airmail! Repay $54 for twenty-nine months. State licensed. Postal Finance, Dept. 11-L, Kansas City, Kansas 66117.

LOSING Hair? Balding? Dandruff? Free copyrighted booklet. Dr. Shiffer Laboratories, 533 Euclid Arcade, Cleveland, Ohio. 44115.

INVESTIGATORS—Electronic surveillance devices. Price breakthrough on ultra miniature professional devices. Free details. Trol Electronics-PS, 342 Madison Avenue, New York, N.Y.

SELECTIVE Introduction Service for single adults expanding to include Nationwide Acquaintance Center. Trained professional staff screens personality profiles to provide wide selection of compatible correspondents for clients. Write Duets, Inc., 6619 Snider Plaza, Dallas, Texas.

CONSOLIDATE All Your Bills into one—small monthly payment! Borrow $100 to $1,000 by mail! Pay off all your debts—repay in convenient, monthly payments . . . take up to 36 months. $5.00 repays $104.65; $14.00 repays $293.02; $25.00 repays $532.26; $33.00 repays $819.57; $40.00 repays $1,009.36. Everything comes to you in a plain envelope! "U.S. Mail" secrecy . . . no cosigners needed! Get the money you need fast . . . Write for information today! No obligation! Dial Finance Co., Dept. 10-215, 410 Kilpatrick Bldg., Omaha, Nebraska 68102.

TIME of End Date Discovered! Free. Write: Harvest Publishers, Jefferson City, Missouri 65102.

PROPERTY Owners. Your mapping specialist, write today, Deed-Ettes, Mt. Pocono, Pa.

**Ugly Blackheads—Out in Seconds**

**VACUTEX**

Keep your complexion free of blackheads—look attractive instantly. Scientifically designed vacuum pump gently "lifts" out ugly blackheads safely. No pinching or squeezing. Made in U.S.A.—Beware of imitations. Try 10 days—if not delighted return for refund. Send $1.25 Postpaid. **BALLCO PRODUCTS CO., Dept. 189, 735 E. State St., Westport, Conn.**

***IMPORTED***

**STILETTO POCKET KNIFE**

**ONLY $1.75**

**9" Overall Length**
**5" When Closed**

- Opens instantly
- Sharp and Tough
- Stainless Steel Blade

Opens instantly — folding finger guard snaps into position automatically. Razor sharp tough stainless steel blade holds its edge for years of long hard service. A knife you will be proud to own. Guaranteed. Money back in five days if not satisfied. Send $1.75 plus 25c to cover postage and handling. NOT SOLD TO MINORS. Please state age.

**WESTBURY SALES CO., DEPT. S-71**
**P. O. BOX 415, WESTBURY, N. Y.**

**PELLET FIRING "45" AUTOMATIC**

- Fires 8 Rounds
- Magazine Clip
- 8 Moving Parts

**ONLY $1.98**

Most authentic full-size model of a "45" we have ever seen. A pull on the trigger fires it and automatically works the slide to reload just like a real automatic. Comes with full instructions for easy assembly, a generous supply of pellets and scoring target. Full money back guarantee. Send $1.98 plus 27c shipping charges or order C.O.D.

**HONOR HOUSE PRODUCTS CORP.**
**DEPT 97AU10 LYNBROOK, N.Y.**

*N.Y. State residents please add 4¢ sales tax.*

A Hilarious Optical Illusion

**X-RAY BINOCULAR SPECS**

**SHOW EXCITING MAGNIFIED CLOSE-UPS**

**Only $1.00**

Scientific optical principle really works. Imagine, you put on your "X-Ray" Binocular Specs and hold your hand in front of you. Instantly you see the image magnified four times in area AND you seem to be able to look right through the flesh and see the bones underneath. Look at your friend—even at a great distance—is that really his body you "see" under his clothes? Loads of laughs and fun at parties, picnics, indoors and outdoors. Detailed instructions for a variety of exciting uses. **Send only $1 plus 25¢ shipping charges. Money Back Guarantee.**

**HONOR HOUSE** Lynbrook, N. Y., Dept. 97BY10

*N.Y. State residents please add 2¢ sales tax.*

## Swedish Inventor Discovers A New Way To Trim Hair At Home In Minutes

Automatic DIAGONAL 4-way cutting action trims your hair an entirely different way. Smooth, expert trims of any desired length & style are assured. New principle makes old style straight trimmers obsolete. Quick, Easy, 100% safe. **TRIMTEX REALLY WORKS. PERFECT FOR MEN, WOMEN & CHILDREN.** Try it for 30 days. Save on hair cuts during trial. Money back if not 100% pleased. Only $1.98, 2-$3.75 ppd. **FREE** Travel Case included. **DIBBEN Co., Dept. 9-O, 545 Fifth Ave., NY 10017.**

BIRTH Certificates, Marriage Certificates, Diplomas! 2 blank forms $1.00. Sample 10c. Standard Forms, Box 482-S, Washington, D. C. 20044.

EMERGENCY Identification Cards. Medical, religious, etc., in plastic. Write for application: Daniel Ansbach, Jr., Rock Glen, Pennsylvania.

FREE Catalog of quality gifts for that special occasion. Modern Items Co., 332 N. 81st, Seattle, Wash. 98103.

SUPER memory overnight! Success guaranteed! Bijou, Box 1727-V, Hollywood 28, Calif.

BED Wetting stopped quickly. Details free. Roberts, Inc., Dayton, New Jersey.

DEBT Escape Plan Used by Thousands. Rapid—Simple—Guaranteed. Free Details. Counselor Reports, Harlingen 16, Texas.

## 80A REMAILING SERVICE

ITALY. Re-Airmailing Service, postage, $1.10. Italian Stationaries . . . Informations, Samples Free. Nick Capodilupo, Box 7096, Nomentano, Rome, Italy.

REMAILS, El Paso, Texas—25c; Juarez, Mexico—50c, Box 9242, El Paso, Texas 79983.

**PRIVATE** Address, Remails 25c. Information Quarter. Horton, Kensington Road, Greenville, South Carolina 29609.

TIJUANA, Mexico, Remails 35c, Airmail 50c. Send unstamped to Dept. PS-10, 4790 La Cruz Dr., La Mesa, Calif.

HAWAII Remails 25c. Mike Brown, 2865 Oahu Ave., Honolulu 96822.

OLD Established 25c; $3.00 Monthly. Degraff, Box 14156S, San Diego, California.

PASADENA remails 30¢. Confidential prestige. Mailways, Box 5071-PS, Pasadena, California 91107.

CALIFORNIA Remailing 25c Monthly $3.00. FESCO, Box 6120, San Francisco, Calif.

SECRET Mail Receiving System. Hedgpeth, 406-PS South Second, Alhambra, California 91802.

PERSONAL remails 25c, $3.00, monthly, money orders 40c. National, 2739½ Tulane, New Orleans, Louisiana.

## 80B LOANS BY MAIL

LOANS by Airmail $100-$1000. Anywhere. Confidential. Write Union Finance, Dept. PS, 222 W. Osborn, Box 7457, Phoenix, Arizona.

LOW-Cost Loans by Mail. $6.00 monthly repays $1,321.39. Borrow any amount. Guaranteed fast, confidential. Write today! Bankers Investment 53-B, Box 1648, Hutchinson, Kansas. 67501.



Urheberrechtlich geschütztes Material

Clip coupon—and take your first big step to real success! I.C.S., Scranton, Penna. 18515

Accredited Member, National Home Study Council

INTERNATIONAL CORRESPONDENCE SCHOOLS ICS 75th YEAR

Dept. 1145, Scranton, Penna. 18515 (In Hawaii: P. O. Box 418, Honolulu.)

Without cost or obligation, rush me "HOW to SUCCEED," the opportunity booklet about the field I have indicated below, and a sample lesson.
New! Special Package for Women!

Name of the course in which you are interested_____

Mr.
Miss_____ Age_____ Address_____
Mrs.

City_____ State_____ Zip Code_____ Working Hours_____ A.M. to_____ P.M.

Occupation_____ Employed by_____

Low rates to members of U. S. Armed Forces!
*Special training programs for industry*

# Cast your ballot for a successful future!

# 253 I.C.S. COURSES

I.C.S. is the oldest, largest school of its kind. Over 200 courses for men and women. High school, business, secretarial, interior decorating, engineering. One for you. Direct, job-related. Bedrock facts and theory plus practical application. You learn from experts. Diploma to graduates.

Clip and mail the coupon **now.** You'll receive, absolutely FREE, 3 valuable booklets that have helped thousands. But don't delay. Cast **your** "ballot" for future success!

**ACCOUNTING**
Accounting for Business
Programmers
Cost Accounting
C.P.A. Review
Estate & Trust Accounting
Executive Accounting
Federal Tax
General Accounting
Industrial Accounting
Legal Accounting
Office Accounting
Personal Income Tax & Social Security
Practical Accounting
Public Accounting
Small Business Accounting
Starting & Managing a Small Bookkeeping Service

**ARCHITECTURE AND BUILDING**
Architectural Drawing & Designing
Architecture
Building Contractor
Building Estimator
Building Inspector
Building Maintenance
Carpenter-Builder
Carpentry & Millwork
House Planning & Interior Design
Mason
Painting Contractor
Reading Arch. Blueprints
Review in Arch. Design & Practice
Review of Mech. Systems in Buildings

**ART**
Amateur Artist
Commercial Art
Commercial Cartooning
Illustrating
Interior Decorating
Oil Painting for Pleasure
Show Card & Sign Prod.
Show Card Writing
Sign Painting & Designing
Sketching & Painting

**AUTOMOTIVE**
Automatic Transmission Specialist
Automobile Body Rebuilding & Refinishing
Automobile Electrical Tech.
Automobile Engine Tune-Up
Automobile Technician
Automotive Mechanic
Diesel-Gas Motor Vehicle Engines

**BUSINESS**
Advertising
Basic Inventory Control
Business Administration
Business Management & Marketing
Business Management & Production
COBOL Programming
Condensed Business Practice
Industrial Psychology
Managing a Small Store
Marketing
Modern Executive Management
Office Management
Programming for Digital Computers
Programming the IBM 1401 Computer
Purchasing Agent
Retail Business Management
Statistics and Finance
Systems and Procedures Analysis

**CHEMICAL**
Analytical Chemistry
Chemical Engineering
Chemical Engineering Unit Operations
Chemical Laboratory Tech.
Chemical Process Control Technician
Chemical Process Operator
Elements of Nuclear Energy
General Chemistry
Instrumental Laboratory Analysis

**CIVIL ENGINEERING**
Civil Engineering
Construction Engineering
Highway Engineering
Principles of Surveying
Reading Highway Blueprints
Reading Structural Blueprints
Sanitary Engineering
Sewage Plant Operator
Structural Engineering
Surveying and Mapping
Water Works Operator

**DRAFTING**
Aircraft Drafting
Architectural Drafting
Electrical Drafting
Electrical Engineering Drafting
Electronic Drafting
Introductory Mechanical Drafting
Mechanical Drafting
Pressure-Vessel and Tank Print Reading
Sheet Metal Layout for Air Conditioning
Structural Drafting

**ELECTRICAL**
Electric Motor Repairman
Electrical Appliance Servicing
Electrical Contractor
Electrical Engineering (Power option or Electronic option)
Electrical Engineering Tech.
Electrical Instrument Tech.
Industrial Electrical Tech.
Industrial Telemetering
Power Line Design and Construction
Power Plant Operator (Hydro or Steam Option)
Practical Electrician
Practical Lineman
Reading Electrical Blueprints

**ENGINEERING (Professional)**
Chemical Civil
Electrical Mechanical
Industrial Management for Engineers

**ENGLISH AND WRITING**
Better Business Writing
Introductory Technical Writing
Modern Letter Writing
Practical English
Short Story Writing

**HIGH SCHOOL**
High School Business
High School College Prep. (Arts)
High School College Prep. (Engineering & Science)
High School General
High School Mathematics
High School Secretarial
High School Vocational

**LANGUAGES**
(Edited by Berlitz)
French
German
Italian
Spanish

**LEADERSHIP**
Basic Supervision
Industrial Foremanship
Industrial Supervision
Personality Development
Personnel-Labor Relations
Supervision

**MATHEMATICS**
Advanced Mathematics
Mathematics and Mechanics for Engineering
Mathematics and Physics for Engineering
Mathematics & Physics for Technicians
Modern Elementary Statistics

**MECHANICAL**
Industrial Engineering
Industrial Instrumentation
Machine Design
Mechanical Engineering
Quality Control
Safety Engineering Tech.
Tool Design
Value Analysis

**PETROLEUM**
Natural Gas Production & Transmission
Oil Field Technology
Petroleum Production
Petroleum Production Engineering
Petroleum Refinery Oper.
Pipeline Engineering

**PLASTICS**
Plastics Technician

**PLUMBING, HEATING, AIR CONDITIONING**
Air Conditioning
Air Conditioning Maint.
Domestic Heating with Oil & Gas
Domestic Refrigeration
Gas Fitting
Heating
Heating & Air Conditioning with Drawing
Plumbing
Plumbing & Heating
Plumbing & Heating Contractor
Plumbing & Heating Estimator
Practical Plumbing
Refrigeration
Refrigeration & Air Conditioning
Steam Fitting

**PULP AND PAPER**
Paper Machine Operator
Paper Making
Pulp Making
Pulp & Paper Engineering
Pulp & Paper Making

**SALESMANSHIP**
Creative Salesmanship
Real Estate Salesmanship
Sales Management
Salesmanship
Salesmanship & Sales Management

**SECRETARIAL**
Clerk-Typist
Commercial
Legal Secretary
Medical Secretary
Professional Secretary
Shorthand
Stenographic
Typewriting

**SHOP PRACTICE**
Drill Operator
Foundry Practice
Industrial Metallurgy
Lathe Operator
Machine Shop Inspection
Machine Shop Practice
Machine Shop Practice & Toolmaking
Metallurgical Engineering Technology
Milling Machine Operator
Patternmaking
Practical Millwrighting
Reading Shop Prints
Rigging
Tool Engineering Techn'gy
Tool Grinder
Toolmaking
Turret Lathe Operator
Welding Engineering Tech.
Welding Processes

**STEAM AND DIESEL POWER**
Boiler Inspector
Industrial Building Engineer
Power Plant Engineering
Stationary Diesel Engines
Stationary Fireman
Stationary Steam Eng.

**TEXTILES**
Carding
Carding and Spinning
Cotton Manufacturing
Dyeing & Finishing
Loom Fixing
Spinning
Textile Designing
Textile Technology
Textile Mill Supervisor
Warping and Weaving
Wool Manufacturing

**TRAFFIC**
Motor Traffic Management
Railway Rate Clerk
Traffic Management

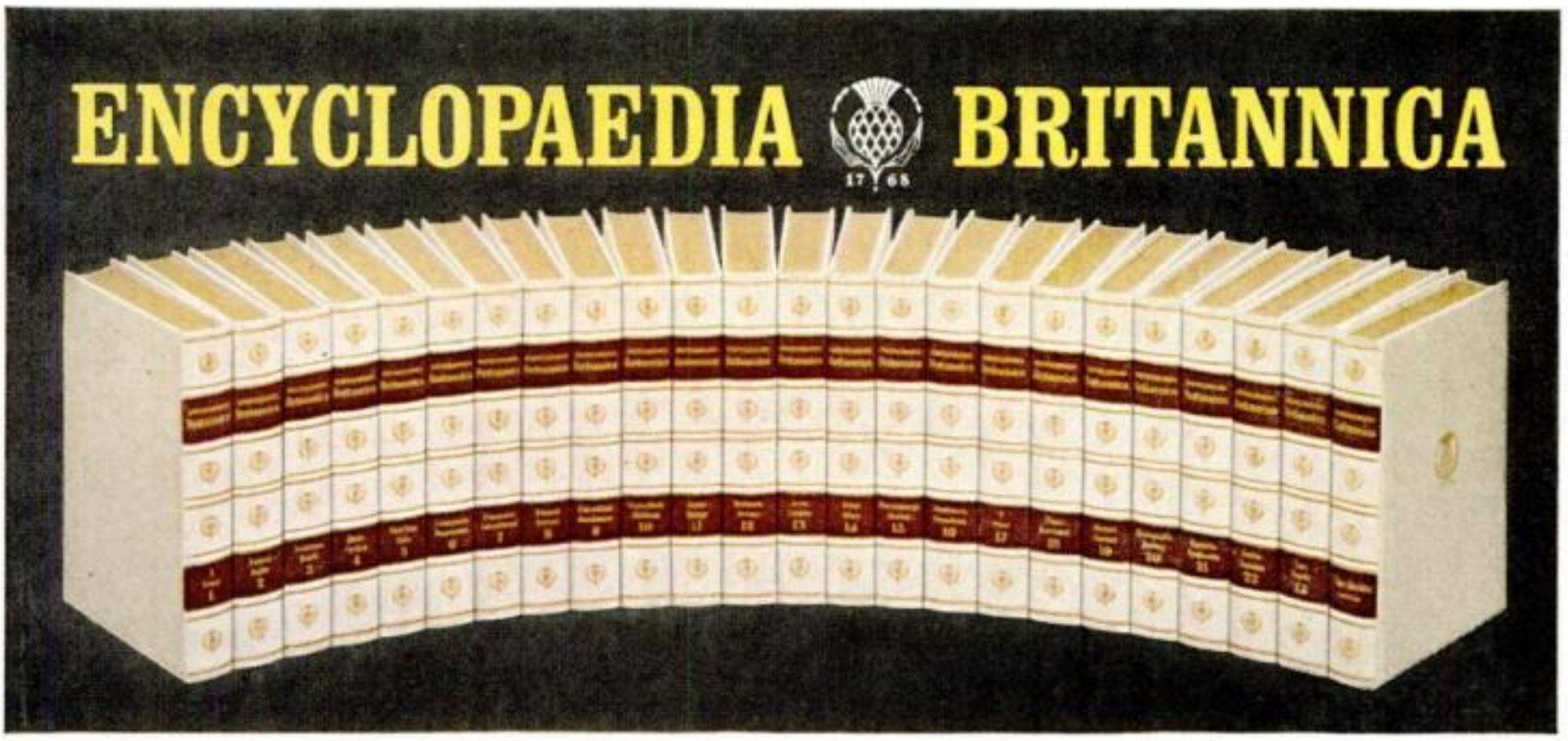
**TV-RADIO-ELECTRONICS**
Communications Techn'l'gy
Electronic Fundamentals
Electronic Fundamentals (Programed)
Electronic Fundamentals with Electr. Equip. Tr'n'g
Electronic Instrumentation & Servo Fundamentals
Electronic Principles for Automation
Electronics and Applied Calculus
Electronics Technician
First Class Radiotelephone License
Fundamentals of Electronic Computers
General Electronics
General Electronics with Electronic Equip. Tr'n'g
Hi-Fi Stereo and Sound Systems Servicing
Industrial Electronics
Industrial Electronics Engineering
Industrial Electronics Engineering Technician
Practical Radio-TV Eng'r'g
Practical Telephony
Principles of Radio-Electronic Telemetry
Principles of Semiconductor-Transistor Circuits
Radio Servicing with Radio Equipment Training
Radio & TV Servicing
Radio & TV Servicing with Radio Equip. Tr'n'g
Second Class Radiotelephone License
Sound Systems Specialist
Telephony, Electronics and Radio Communications
TV Receiver Servicing
TV Technician



Urheberrechtlich geschütztes Material

# Available direct from the publisher

**NEW EDITION OF THE WORLD FAMOUS**




*You get all 24 volumes...pay later on easy*

# Book a Month Payment Plan

Yes, the latest edition of Britannica – the greatest treasury of knowledge ever published – is being offered on a remarkable direct-from-the-publisher plan. All 24 volumes will be placed in your home NOW... you pay *later* on convenient budget terms. It's as *easy as buying a book a month.*

### Benefits Passed on to You

You may wonder how we're able to make this truly amazing offer. First, we have ordered a tremendous printing which materially reduces our costs, and, under a remarkable *direct-from-the-publisher plan,* we pass the benefits on to you.

### Thousands of Subjects of Practical Value

In the new edition of Britannica, you will find thousands of subjects that you and your family will refer to in the course of your normal day-to-day affairs. For example, you'll find special articles on household budgets, interior decorating, medicine and health, home remodeling, child care, adolescent problems, rules and regulations for all sports, every kind of hobby... plus a treasure house of knowledge on all subjects. Usable information that can save you many dollars.

### New Edition Is Profusely Illustrated

The new Britannica almost "televises" information with over 18,000 magnificent illustrations. But it does not merely show "attractive" pictures – it is the work of 10,081 of the world's greatest authorities.

Britannica in your home can give you the broad knowledge that makes people listen when you talk, enabling you to speak factually and intelligently on the widest range of subjects.

### Essential for Homework

For students, Britannica is indispensable. It is the finest and most complete reference set published in America. Its use develops the active, alert minds that bring success in school and later life.

Britannica has always been the symbol of a good home. It is a treasure house of knowledge that can open a richer, fuller, more successful life to every member of your family.

### Preview Booklet Offered FREE

Simply fill in and mail the postcard today, and we will send you... *without cost or obligation*... a copy of our beautiful new booklet which contains an exciting preview of the latest edition of Encyclopaedia Britannica. Mail no money. It's yours *absolutely free!*

In color so beautifully etched it gives the illusion of a third dimension, you will see art treasures of famous museums, world landmarks, scientific wonders. Also pictured is the most magnificent scenery on the North American continent and a cruise through Europe to the mysterious Orient.

When we receive your postcard, we will send your free booklet. There is no obligation, of course. However to avoid disappointment, please mail the card today before it slips your mind.

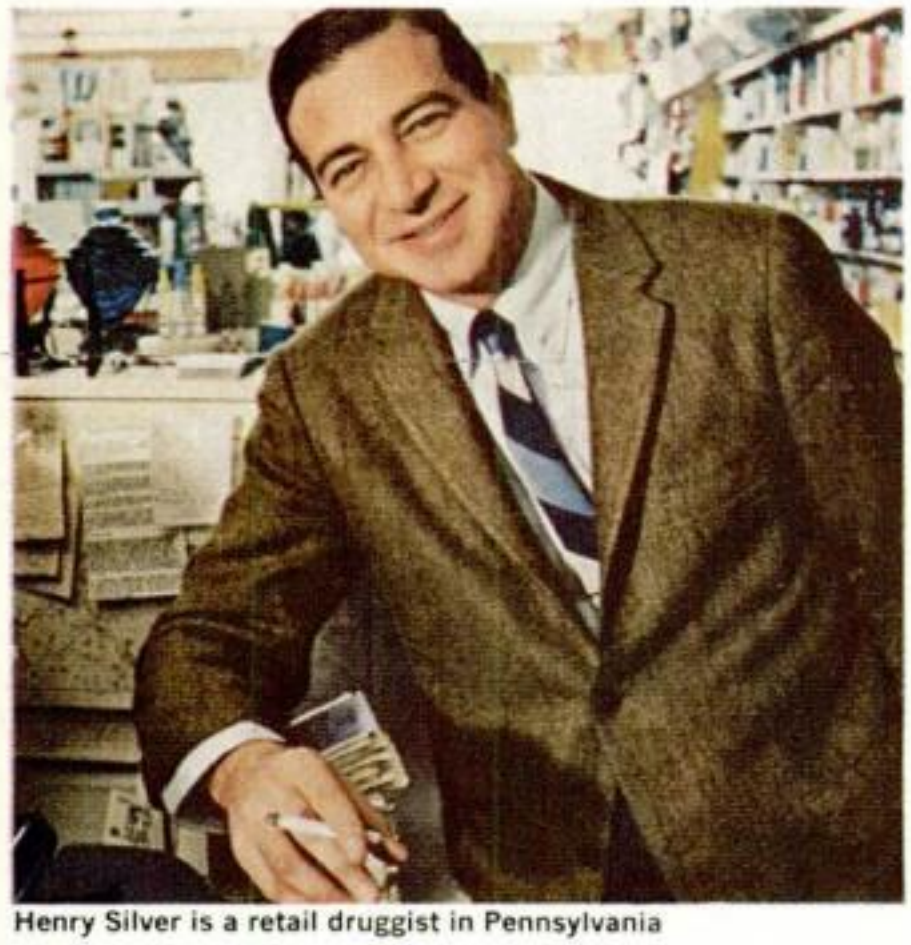
*Clip and Mail this Card NOW for* FREE BOOKLET

**Caution: Be sure to clip on dotted line. Coupon becomes a FREE self-addressed postcard—needs no stamp or envelope!**

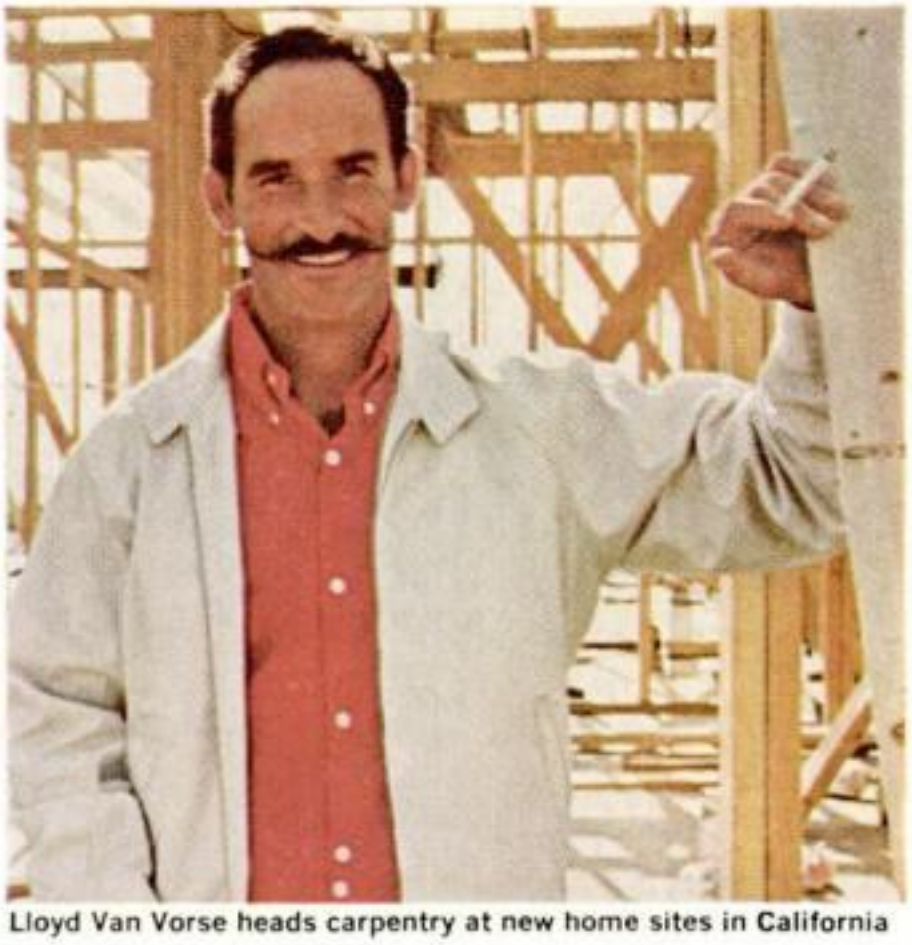
Urheberrechtlich geschütztes Material

# Chesterfield People:

## They like a mild smoke, but just don't like filters. (How about you?)



Henry Silver is a retail druggist in Pennsylvania



Lloyd Van Vorse heads carpentry at new home sites in California

Robert Thomas arranges transportation at a Nevada hotel

Chesterfield People get the taste that satisfies. Do you?

If you like a mild smoke, but don't like filters, try today's Chesterfield King—mildest-tasting Chesterfield in 53 years. Vintage tobaccos—grown mild, aged mild, blended mild. Made to taste even milder through longer length. They satisfy!

**CHESTERFIELD KING** tastes great...tastes mild!

Urheberrechtlich geschütztes Material